

# RAILROAD GAZETTE

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## EDITORIAL ANNOUNCEMENTS.

**THE BRITISH AND EASTERN CONTINENTS** edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It consists of most of the reading pages of the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

**CONTRIBUTIONS.**—Subscribers and others will materially assist in making our news accurate and complete if they will send early information

of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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FRIDAY, SEPTEMBER 1, 1905.

We print this week a digest of a circular issued by a well-known grain trading firm in the West which is distinctly on the bull side of the market, but which nevertheless gives a good idea of the situation when this one limiting fact is kept in mind. Indications point to an exportable surplus of from 150,000,000 to 200,000,000 bushels of wheat this coming year as compared with an almost total shortage in the year just closed (4,394,402 bushels); with 44,230,169 bushels in the year ending June 30, 1904; with 114,181,420 bushels in 1903, and 154,856,102 bushels in 1902. It is still a little too early to tell just how the crops are going to turn out, but it is evident that there is to be an extremely large rail and ocean movement not only of wheat but in flaxseed, where a bumper crop is predicted, and in corn. We have pointed out before, that when a good wheat crop is supplemented by a good crop of corn, oats and other grains, more wheat finds its way to the seaboard than when there is a shortage in these other crops, and the farmer has to keep the poorer quality of wheat at home to be mixed for feed. We also have pointed out that the producing capacity of the country at a present average of some 12½ bushels per acre is about taken up; this statement not including Canada, but referring merely to the wheat producing area within the boundaries of the United States; and that unless care is taken to introduce improved methods of culture, for which there seems at present to be no great disposition among the farmers, wheat exports must tend steadily to decrease, in view of the fast growing home consumption. The crop this year has been produced under extraordinarily favorable climatic conditions, and seems likely to make an export record which will hold for some time; until the great Canadian Northwest, which can be described as scarcely developed at all at present, begins to rapidly increase its output. There can be no doubt that the Grand Trunk Pacific will add enormously to the export grain tonnage, after it has built up its northern country. The grain trade bulletin which we reprint this week is inclined to predict a shortage of ocean carriers and consequently high ocean rates, but to this belief we must demur. Rumors of the great crop have preceded its movement by so long a time that it seems quite as reasonable to expect that the charter ships which will come over here looking for grain will exceed the demand. At the time of the last great wheat crop, in the year ending June 30, 1902, there was no such over-production of shipping as there has been in the last two years, and ocean freights have now had a long period of depression

because of the lively competition for cargoes. The effect of an abundance of carriers, however, is felt more by the European consumer than by the American producer.

## SOME RESULTS WITH CONCRETE TIES.

About a year ago, in giving a brief resume of the cross-tie situation in these columns, it was asserted that makes of ties other than wood must have a life of at least ten years to enable them to stand on an even basis of cost with the latter; and that all experiments up to that time with substitute ties had proven a failure before the end of ten years, with one or two exceptions, which had lasted about that long. Mention was also made of forms of ties then in use for three or four years, which apparently were yielding hopeful and instructive results, although not all could be classed as unqualified successes, and some were far from such. The Pennsylvania Lines West of Pittsburg have been trying reinforced concrete ties for several years, and the results to date have been quite unsatisfactory, according to information furnished us by Mr. R. Trimble, Chief Engineer of Maintenance of Way of the Northwest System. Three different designs have been tried. In the first case, tried about six years ago, a lot of 30 reinforced concrete ties were removed at the end of a year, principally because of the weakness of the fastening between tie and rail. Some of the ties also are quite badly broken. About three years later an experiment was made with another design of reinforced concrete tie. There were 300 of these ties in the first lot, which were received in the winter time, and 21 were put into the track at once. All were removed within a month, because the concrete broke away from the reinforcing metal. These were then replaced by new ties, which were put into the track in the spring, along with the balance of the original lot of 300. Breakage of a great many soon ensued, however, and by the middle of the summer about half of them had been removed. Two more lots of 100 each were added between that time and the fall, to replace broken ties. But removals were continuous, so that by the spring of the present year only about a hundred were left, and most of these were imperfect. Inspection of them ceased at that time, as they were considered a failure. These ties were laid in stone ballast, and were subjected to very heavy traffic. Some of this same design laid in a division where traffic was lighter gave slightly better results. That is, they broke less quickly, although many of them

were broken within a year's time; but despite their poor condition the track remained in good condition as to line and surface with a small amount of labor. Last year trial was made of another design, 100 being used. These also were a total failure, and all had been removed by spring of the present year. This design failed by the concrete crumbling and breaking under and outside of the rail, and showed transverse cracks at the rail-holding bolts.

Somewhat in contrast with the results on the Pennsylvania is the experience of the Lake Shore with the same design of tie most largely used in the former's trials. Chief Engineer Rockwell advises that they have a very large number of these ties which have not failed, nor do they expect them to fail. Certain of the ties, which were placed in a position where the worst possible test could be given them, have failed, he says, partially on account of poor concrete and partially on account of the jar from fast moving trains.

Three years ago we gave an illustrated account of a piece of work involving the use of concrete ties in three-quarters of a mile of city street, with the object of providing a permanent track construction. (*Railroad Gazette*, August 29, 1902.) The ties were laid in cement mortar on a bed of concrete. A recent inquiry regarding the condition of these ties and roadbed elicited the information that not a single tie has broken, that the track is in as perfect line and surface as when laid, and this with no attention in the interim. It should be known in connection with this piece of track that trains with heavy locomotives pass over it at full speed, except at one end, where the brakes are applied preparatory to the station stop.

One rather significant point to note in connection with the Pennsylvania results is the statement that regardless of the poor condition of the ties on the division having the lighter traffic, the track remained in good condition as to line and surface, with little labor. Mr. Rockwell, of the Lake Shore, expresses the belief that there is a large field for concrete ties, although he is inclined to think they should not be laid in fast tracks, as undoubtedly the material is not suited for continuous heavy shocks. Another well-known chief engineer of a railroad, in referring to this phase of the matter, pointed out that there is an important difference between steel-concrete and concrete-steel ties; the distinction having reference to the manner of combining the two materials. In the former, he asserted, the steel takes the load and vibration, jarring the concrete loose, and a failure is the result.

#### THE CENSUS OFFICE RAILROAD VALUATION.

The valuation of the railroads of the United States which has been made by Professor Adams and his assistants in the Census Bureau (*Railroad Gazette*, August 18, page 168) is one of the most elaborate mathematical studies of business conditions that a statistical idealist ever evolved, and it would do credit to the faculty of a German University. And, on the whole, the theoretical basis on which it is founded is right and proper. But how much good it will do is another question. If any state assessing officer has become weary of fixing railroad valuations by tossing a penny, or by guesswork, or as the result of three-day wrangles with railroad lawyers, he can here find a way of escape—provided he is possessed of a backbone like a telegraph pole. No argument is needed to show the reasonableness of Professor Adams' theory. Every assessor knows that railroad valuations based on first cost or cost of replacement are utterly worthless; that valuations based on the total of stocks and bonds often produce unjust assessments; that the gross earnings of a year tell nothing about the real profit, and that dividends often conceal more than they show. Every investor or other person who desires to know the real present value of a railroad, and who has access to the necessary information, proceeds on the same theory that is here employed in the census. The cost of a railroad may have been made grossly excessive by bad judgment or by fraud, and on the other hand, it may be far less than the present value by reason of growth of population and of land values. The face value of stocks may be ten or fifty times the value of the property, or it may be far less than the true value; and even the market value may represent many factors besides those based on the railroad itself—as, for example, profitable investments in a distant state. Gross earnings may increase while profits and ability to pay taxes may decrease.

In spite of the strong support that Professor Adams finds for his theory in the simple rules of logic and common sense, it is not surprising to find railroad officers and their spokesmen protesting against what he has done; for in discussing valuations with state taxing officers, railroad men find that logic and common sense are often more honored in the breach than in the observance. The rail-

road officer usually finds himself forced to use every possible argument for a reduction, for the reason that on the other side every possible argument is used for an increase. Prof. Adams disavows any purpose to fix values for taxation, but that will not hinder state officers from using the values for that purpose. All of the state tax valuations reported by the census office, except for Connecticut, are now below the true valuation, and most of them very far below; but this is explained, more or less fully, by the fact that all valuations of every kind of property are usually much below real values and by the fact that railroads pay some taxes in other ways than by state valuations.

Of course, the rational method of assessing is to ascertain real values, and, where values which have been too low are raised, to reduce the rate of taxation accordingly. That is what was done in respect to real estate values in New York city two or three years ago. There was a great hue and cry then about the injustice of raising valuations, but when the tax bills appeared, not materially increased, the complainers found that they had been making a false alarm. If the old and the new valuations are both equitable, as between one taxpayer and another, a change in figures can, of course, make no change in the actual burden. The trouble with the taxes of railroad companies is that usually they are not equitable; they are wholly or partly inequitable, as related to other taxpayers, and often are subject to renewed efforts, in successive years, to make them still more inequitable. Theories of taxation are so varied and discordant that no assessor makes any headway in trying to improve his own theories by studying the experience of other states, and all theories are subject to so many exceptions that few assessors feel themselves to be on firm ground. Nowhere does the student of economics find confusion worse confounded than in the field of state taxation of railroads. Of course, this confusion is not by any means due entirely to the difficulty of finding and applying correct theories; it is largely due to perversity in state officers who are "agin' the railroads" or of railroad lawyers who attempt, by securing low valuations or assessments, to get even with the public for all of the real or supposed injustice that the railroad may have suffered at the hands of the legislature or the courts.

But if this valuation of railroads, made solely for the purpose of filling out the Census Bureau's estimate of the total wealth of the nation, is in any degree injurious to the railroad interests the injury is already done; for the figures have been published throughout the country. The only course now for the railroad attorney to take in the matter is to fight for equity in actual rates and assessments. If that has been his course heretofore he can but continue in the same line. If he has hitherto tried to reduce taxes by deceiving the assessors as to values he may have to change his methods. If the interminable discussions before state boards over railroad taxes, which use up so much valuable time, can be changed from rivalries in the art of confusion to sane efforts to secure the application of equitable rates to all property, it is possible that great good may be accomplished.

In the meantime, Professor Adams's essay affords an interesting study in the details of the task of finding the commercial value of a railroad. His first principle is to base the value of the railroad on its net earnings from operation (excluding income from outside investments or from securities of other railroads), capitalizing these at a rate based on the market value of the company's stock and bonds. To avoid the influence of fluctuations in business he takes an average of the income of the railroad for a period of five years. From the operating expenses he deducts sums spent for permanent improvements, which, of course, inure to the profit of the stockholder. The net operating expense thus found is deducted from the gross earnings and the remainder is called the true net earnings from operation. Next the taxes are deducted, leaving the true profit from operation. Where profits have shown a steady falling off for five years the average for the last three years is taken, and sometimes the three-year term is used where profits have increased. This last course is pursued more rarely because the purpose was to obtain a conservative estimate of profits. Where the operating mileage has changed, one average for the whole five years has been taken, except where this showed a profit appreciably larger than during the last year, when a reduction was made.

For a suitable rate of capitalization, instead of taking arbitrary interest rates, which would involve the element of personal judgment, an elaborate study was made of the New York stock market quotations for a period of 27 weeks ending July 1, 1904. The price of bonds was stripped of accrued interest, and stocks were stripped of the value of expected dividends, in cases where the dividend



history of the company seemed to warrant such expectation. Professor Adams gives a long explanation of the rules by which he computed his average of stock-market prices, and his assistant, Mr. Wm. J. Meyers, gives in the appendix a still longer one. The arithmetic average was adopted, rather than weighted averages (which take account of the volume of transactions) because the simple average results in a lower price. Where stocks or bonds were not quoted, valuations were made by analogy with other issues in the same system. Current liabilities were excluded. The rate of annual return on bonds selling above or below par was computed by Deghuet's tables.

Having found what the stock and bonds receive, and dividing this by their present value, he has the average *rate* received by all the investors in that property. But the total *amount* received by the investors may represent much more than the profit from the operation of the railroad, for the stock and bonds may cover extensive outside investments. But this *rate*, which the investor receives on all his interests in the company, is deemed a fair rate for him to receive on that part of his interest which is based strictly on the operation of the railroad. The net profits from operation for a year are what must furnish the funds for the payment of the investor and therefore the capitalization of these profits, at the rate found, gives the true value of the railroad operating property.

The Census office required the valuation to be distributed to the several states and territories. As no engineer's estimate of cost of construction was available, and as distributions by track mileage, or by stock and bonds, or population, or density of traffic, or car mileage, are inexact, and as no data were available for net earnings, while most roads had divided or could divide gross earnings, the gross-earnings basis was adopted. In some cases, where the railroads could not make the division, a special compilation was made for a single month and the ratios thus reached were used. The value of a terminal is spread over the line or lines that make use of it, and no attempt was made to decide as to how earnings should be divided between a main line and a feeder. No inquiry was made of the railroads concerning their rule for reporting gross earnings by states, where the trunk line was located in one state and the branches or feeders in another.

To test the results of the census work, Mr. J. Shirley Eaton was employed to examine the valuations made by railroad experts of a number of important railroads which have changed hands during the past nine years. These studies showed that the methods adopted by the Census Bureau conformed very closely to those followed in the business world. Comparisons were made, also, with the formal or implied valuations of railroad properties made by state tax boards; but, as might have been expected, this work amounted to nothing. Agents were sent to a large number of states to study the records, but the great variety of state laws and the marked divergence in practice made it impossible to arrive at any tangible results. A comparison was made, however, of the commercial values, as found by the census, with the latest reported valuations as made for taxation. The reader will recall that this table, as given in the *Railroad Gazette* of August 18, showed many extreme discrepancies. Some of these are explained. For example, in Connecticut, where the tax valuation is 114 per cent. of the census valuation, it appears that, under the law, the assessors base their statement on the stock and bonds and floating debt taken at their market value; and these securities include, of course, all the property of the railroads within the state. In the case of the New York, New Haven & Hartford, this probably includes large investments in steamboats and in street railroads.

In the first part of the bulletin Professor Adams says that the "strategic value" of a railroad was considered in estimating the figure at which it ought to be capitalized. It does not appear from the bulletin how much use he has made of this idea, but in the list of railroads, given in the table showing the rates of annual return on capital—which list, however, does not include every railroad in the country—there are four cases in which the rate of capitalization finally adopted is different from the rate of return on all the securities as computed. For example, the securities of the Gulf & Ship Island produce an annual return of 5.248 per cent., while the rate of capitalization adopted is 5.250. The Pacific Coast Company's securities yield 8.333, but the rate of capitalization is 7.500. The bonds of the Duluth, South Shore & Atlantic yield 4.410, but the stock yields nothing, and the rate of capitalization adopted was 4.400. The stocks and bonds of the Mineral Range road yielded 3.494, but the rate adopted is 5.500.

A large part of the interest of this bulletin centers in the

essays which figure as supplements; the general explanation of Professor Adams being amplified by more detailed discussions by Professor B. H. Meyer, of the University of Wisconsin; Mr. W. J. Meyers, of Chicago; Professor H. M. Bowman and Professors M. E. Cooley and W. D. Taylor, and Mr. Eaton as already mentioned. Professor Meyer describes methods of valuation, methods of distribution of values among the states and methods of valuing railroads in foreign countries. Mr. Meyers describes the refined mathematical processes by which the rate of capitalization was computed. The other gentlemen named tell what has been done in Michigan and Wisconsin, where Professor Adams was engaged, four years ago, to prepare a plan for the valuation of the railroads. Professor Adams's own description of this work is also given.

The computations on which this census report is based must have involved an enormous amount of labor, even with the aid of tables and mechanical aids to computation. How much it has cost is not stated, of course. Those who declaim against the whole enterprise as academic and unnecessary, if not unjust, will declare the whole sum wasted. But as Mr. Eaton, in his essay, says that Speyer & Co., in valuing the Rock Island, last year, spent something like \$100,000 on the job, the Census office will probably claim that the Bulletin represents a fairly wise expenditure of public money. And it is not for the humble editor to deny the claim!

#### Street Railway Capital and Earnings in 1905.

The statistics of street and elevated railways throughout the United States and Canada, compiled from returns of the various properties as given in "American Street Railways Investments" and printed in abstract in the *Railroad Gazette* August 11, are very incomplete, but they constitute the only regular annual statistics of street railways in this country. The recent report of the Census Bulletin for the year 1902 was presumably compiled with great care, but it was over two years old when it came from the press, and American street railway properties are changing some of their characteristics with such rapidity that this lapse of time takes away much of the value of the figures. According to the returns at hand there were 993 roads in the United States in 1904 and 42 in Canada. The track mileage in the United States was 29,548 as compared with 27,754 in 1903; and in Canada the track mileage was 861, an increase of only one mile from the previous year. Following the mileage figure the returns which are naturally sought next are the gross earnings and operating expenses, and these are conspicuous by their absence. It is a singular commentary on the American street railway situation at this critical and interesting period of its development that no authority publishes the earnings and expenses of these roads in annual form. It is most desirable that this should be done, for, although an aggregate figure of this character has in itself no *prima facie* value to the investor, except as showing the general trend of developments, it was found that the statements of the steam railroad companies were greatly improved when annual returns were required from them. At present the returns of the street railway companies are made in a more or less haphazard manner, and it would be very helpful if they were all required to present uniform reports in which certain items would always be found under certain heads. It is with the greatest difficulty at the present time that the expense accounts of many of these lines can be analyzed, and a suspicion often exists, which it is frequently impossible either to prove or disprove, that dividends are not earned.

The figures of capitalization are shown fully, although we cannot vouch for their accuracy. The total capital liabilities of these 29,548 miles of line during 1904 are stated at \$3,217,091,971. This sum was made up of capital stock aggregating \$1,761,571,812, and funded debt to the amount of \$1,455,520,159. Per mile of track the average capitalization—total of stocks and bonds—throughout the country was \$108,876. This is too high, and it is entirely safe to say that a good proportion of it is made up of stock which represents little more than promoters' profits and has no especial relation to the cost of the plant. The best sidelight on this figure of average capitalization is obtained by taking the figures of capital stock and funded debt in the State of Massachusetts, where the Railroad Commission limits these issues to what it terms "fair replacement value." The cost in Massachusetts is accentuated by the expensive elevated and underground system in Boston; also by the fact that in a populous state franchises cost more, real estate and right of way cost more, and larger equipment is necessary, and a comparatively great proportion of the mileage is made in city streets. Yet, in spite of all these elements which would tend to higher cost, the average capitalization in Massachusetts per mile of track was only \$49,158 in 1904; considerably less than half of that of the country as a whole, including Massachusetts. The average capitalization (stocks and funded debt) of the steam railways in the United States was approximately \$45,683 in 1903. The figure ordinarily given for capitalization is that of route mileage rather

than track mileage, but track mileage makes a much fairer comparison since the mile of track and not the mile of route is the unit of cost.

The figures at hand divide the street railway mileage of the country into five groups. The first group contains the six New England states, with 4,606 miles of track; the second group contains seven other Eastern states and the District of Columbia, with 9,156 miles of track; the third group contains nine Central states, with 10,728 miles of track; the fourth group contains nine Southern states, with 1,495 miles of track, and the fifth group contains 17 Western states and territories, with 3,563 miles of track. In 1903 there was no street railway mileage in South Dakota, Nevada and New Mexico. To-day, every state and territory except Alaska is represented, but there are ten states in the western group and five in the southern that have less than 100 miles apiece. Ohio leads all the states with 3,437 miles; a mileage almost as great as that of the entire western group. Pennsylvania is a close second with 3,319 miles, and New York, with 3,192, is third. Massachusetts has 2,734 miles and Illinois 2,080. It is rather surprising to find only 73 miles in North Carolina, and there is every reason to suppose that the southern and western states will soon receive the great influx of these lines which has been so marked as far west as the Missouri river and as far south as the Potomac.

#### Indian Railroads in 1904.

The Administration Report on the railroads in India for the calendar year 1904 shows that 27,565 miles of line were open. Of this mileage about 20,000 miles is owned by the state, something over 3,000 miles by native states, and about 835 miles by branch line companies receiving rebates from traffic interchanged with main lines, and the balance of the remainder by companies receiving some form of governmental guarantee. Something more than half of the entire amount is 5 ft. 6 in. gage, and the majority of the remainder is 3 ft. 3½ in. gage; although there is about 800 miles of 2 ft. 6 in. gage and something under 300 miles of 2 ft. gage. The history of these railroads begins with the year 1853. In 1860 approximately 1,000 miles were open; in 1870, nearly 5,000 miles; in 1880, 9,000 miles; in 1890, 16,000, and in 1900 nearly 25,000. During 1904, 621 miles of line were opened for traffic and 850 miles additional were sanctioned. Gross earnings of all Indian railroads in 1904 amounted to approximately 3,965 lakhs of rupees (say, \$126,880,000) against 3,601 lakhs of rupees (\$115,232,000) in 1903. Net earnings reduced to American currency amounted to \$66,799,040, in 1904, an increase of \$6,327,680 over the year previous. These net earnings yielded a return on the capital outlay of open lines and lines partly open, of nearly 6 per cent., which is an improvement of about ½ per cent. over the return yielded in 1903. The passenger traffic of these Indian lines is an extremely important source of income. Out of the total earnings in 1904 passenger traffic contributed almost a third; a proportion which has held roughly from the first. Much of this passenger traffic is carried in the very lowest class, with accommodations considerably inferior to any found in Europe, and at rates very much lower. The average passenger mile rate from all classes was under ½ a cent a mile, and the average distance traveled was about 40 miles. There have been no material fluctuations in these figures since 1884.

The financial result of the working of the state and guaranteed railroads in 1904 was a net gain to the state of \$8,423,040; the largest amount yet earned in any year, after meeting, in addition to the expenses of working, all charges for interest on capital outlay by the state and on capital raised by the companies, and also the annuity payments for railroads purchased by the state, including both interest and sinking fund payments. This is the fifth consecutive year that there has been a surplus. Since the appearance of the last annual report, the railroad administration has been centered in what is known as the Railway Board, instead of in the Railway branch of the Public Works department, as heretofore. This is the outcome of a suggestion made by Mr. Thomas Robertson, C.V.O., in his report on the working of Indian railroads made by order of Parliament in 1903. Mr. F. R. Upcott, Government Director of Indian Railway Companies, is Chairman of the Board, and the other members are Mr. W. H. Wood, General Manager of the Hull & Barnsley Ry., England; Mr. T. R. Wynne, Agent and Chief Engineer of the Bengal-Nagpur line, and Mr. Neville Priestley, Secretary. These gentlemen assumed office in March, 1905.

The total capitalization of the lines open at the close of 1904 amounted to \$1,113,021,120—\$40,378 per mile. As is customary with Colonial, and especially with Indian reports, a tremendous amount of statistical information is included in the volume at hand, in sharp contrast to the meager returns given by the home companies. The report of Indian railroads for 1904 consists of 271 pages of the standard blue book size (8 x 13 in.), and the statistical information is given with fullest detail, frequently dating back to the beginnings of each line. In the joint interests of utility and

economy, something between the standard British report and the standard Indian report would seem to be desirable.

The New York *Independent*, a weekly magazine with an intelligent and enterprising editor, has lately entertained its readers with a number of articles by unusually clear headed "working men"—using that term in its broadest and best sense—setting forth the position and claims of one or another class as against capital, or to meet the criticisms of the public; and in the last issue a veteran locomotive runner tells "The Engineer's Side of It"—gives the public the engineman's defense in connection with collisions and derailments where the engineman has been charged with the chief responsibility. He does not specify cases, but, after giving an account of experience, which is of a kind too familiar to our readers to require reproducing in this place, he says:

No class of men on the face of the earth have a keener appreciation of their responsibilities than locomotive engineers. "In case of doubt take the safe side" is a fundamental rule of train operation, a rule that is drilled into an engineman from the very moment he begins service as a fireman until it becomes part of his life, a constant admonition to caution. He is drilled to regard the sacredness of a train order, the importance of a strict observance of signals and rules the great need of caution, and the absolute necessity of keeping his wits about him and never forgetting a meeting point or the slightest detail of an order. He lives constantly in an atmosphere of caution, of admonition. The necessities of his calling, the responsibilities connected with it, become a part of his life. He lives in a world of his own and belongs to a class set apart from other men. . . . Now, I ask, is not this training calculated to develop men of keen and retentive memory, men who have a minute regard for detail, men who are more likely than others to strictly obey orders and observe signals, men who are unlikely to take unnecessary chances? If the people suffer from the errors of engineers to a greater extent than they believe they should suffer is it not right to take into consideration the services they are forced to perform before pronouncing judgment?

We refer to this article here only for the purpose of adding the obvious conclusion, which the *Independent* omitted to give to its readers. Accepting the engineman's defense just as he offers it, must not the public demand an improved system? Either the men or the system must be wrong, or we should not have the distressing collisions and derailments; and if the men are already as good as can be found, the method of managing and regulating trains must need changing. So far as collisions are concerned, this conclusion is coming to be quite generally accepted, the space interval being adopted in place of the time-interval—though not fast enough. The editor of the *Independent*—who, by printing articles of this kind anonymously, assumes some responsibility for the discussion of the subject—ought also to have called for more detailed explanation. The veteran engineer confines himself too much to generalities. The public wants to know how it is that there are so many exceptions; so many enginemen who evidently do not "live in an atmosphere of caution"; who have not been "drilled to regard the sacredness of a train order."

#### Lehigh Valley.

A brief historical résumé of this property was printed in the *Railroad Gazette* last year (Sept. 30, 1904). It is sufficient here to mention that the road was originally an isolated coal carrier, very prosperous. Under the presidency of the elder Packer, the terminals at Lyons, Cayuga, Elmira, Mt. Carmel and Philadelphia, and a New York entrance, were established, and left unchanged for many years. Hartshorne succeeded Packer in 1880. H. E. Packer succeeded Hartshorne in 1883, and Wilbur succeeded the younger Packer in 1884. Under Wilbur's administration extensions were made to Buffalo, Lake Ontario, etc. Too much money was paid out in dividends, and the road was in thoroughly bad shape in 1893. It was left to Alfred Walter (1897) to put the property on its feet by turning earnings back into it, in spite of protesting stockholders. E. B. Thomas succeeded Walter early in 1903, and has conducted the enterprise with great energy and judgment.

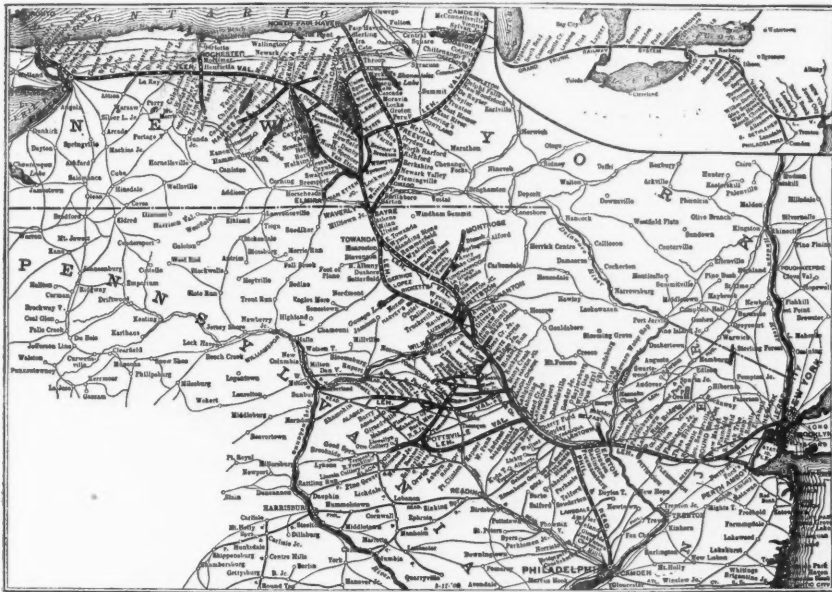
The report for the fiscal year ending June 30, 1905, is the fifty-first annual one to be presented to the directors. The year was extremely prosperous, the large increase in gross earnings being only slightly offset by increased operating expenses. Total earnings were \$31,275,843, an increase of \$1,394,105. Operating expenses were \$18,929,701, an increase of only \$59,400; leaving net earnings \$12,346,141, an increase of \$1,334,704 from the returns for 1904. The most unusual feature of these returns was the decrease of \$290,768 under the head of conducting transportation in the general expense account, since there have been indications of extravagance that have shown particularly in this part of the expenses on almost all of the railroads which have recently made their reports. The other income added to net earnings, consisting of dividends on stocks, etc., would have been larger this year than last except for a considerable increase in the deficit from the working of water lines. This deficit amounted to \$120,851 in 1905 as against \$13,315 in 1904. Deductions from total income were not materially changed during the year, although they aggregated slightly more. The net income of the Lehigh Valley Coal Company was smaller in 1904, but the total net income (\$6,028,437), after all deductions, was \$916,440 greater than last year.

Exclusive of its water lines, the company has doubled its net earnings since 1902, and this has been accomplished not so much



through the actual increases in gross, although these have been good, as by the radical reduction of operating expenses. The gains in passenger traffic constitute an interesting feature of the report. The best passenger year the company ever had was in 1902, when it was in position to make a strong bid for Pan-American traffic, and the department earned \$3,664,820. This year, however, with no obvious special sources, its passenger business brought in \$3,509,325, an increase of over 11 per cent. from 1904. The increase in general freight traffic, including both merchandise and coal, was 8½ per cent., while coal and coke tonnage alone, not including company's service, increased 7 per cent.

Taking up the operating statistics in further detail, it appears that the company obtained a slightly better average loading; average revenue tons per train mile amounting to 501 in 1905 as against 486 in 1904; and average tons per loaded car mile amounted to 20.31 as against 19.76. With an additional car mileage of 3,548,202, ton miles were increased 207,273,153. Of the 26 detail items under the head of conducting transportation there were minor increases in 15, as was to have been expected from the considerable increases in traffic, but these were far more than offset by the decreases. The most important decrease was in the cost of fuel for locomotives. The total locomotive mileage was 485,180 miles greater than in 1904, yet coal cost \$192,531 less; the increase being \$2,457,800 for 20,077,442 locomotive miles, an average fuel cost of about 12 cents a mile. The other chief decrease under this head was in rents of tracks,



Lehigh Valley.

yards and terminals, which cost \$129,913 less than in 1904. There was also a tremendous increase in switching charges, which cost the road only \$1,457 in 1905 as against nearly \$50,000 in 1904, and in injuries to persons, the cost of which to the company decreased over 100 per cent. Maintenance of way and structures for the year cost \$3,269,383, an increase of \$210,125; the principal items of increase being repairs of roadway and renewals of rails. The total mileage of the company is 1,393, of which 576 miles has second track and 35 miles has third track. There are also 1,000 miles of yard tracks and sidings on the system; but, excluding these and deducting mileage controlled by stock ownership and trackage rights, the company appears to have spent about \$1,847 for maintenance of way and structures per mile of single track. Maintenance of equipment in 1905 cost \$4,894,269, an increase of \$148,928; the principal item of increase being repairs and renewals of locomotives. The repairs and renewals cost, on the average, approximately \$3,150 per locomotive owned; a figure obviously very liberal. The number of locomotives at the end of the year was the same as last year, but the total tractive power was increased 162,572 lbs. Twenty-six locomotives were rebuilt during the year and 20 heavy freight locomotives and 20 75,000-gallon tenders were purchased and charged to expenses and equipment renewal reserve in the capital account. Repairs and renewals of freight cars cost \$1,820,172, a decrease of \$9,593. This is at the rate of over \$50 per car.

The principal statistics of operation follow:

	1905.	1904.
Mileage worked .....	1,394	1,393
Coal earnings .....	\$13,530,337	\$12,835,076
Other freight .....	12,432,583	11,994,701
Passenger .....	3,509,825	3,155,715
Total earnings .....	31,275,843	29,881,738
Maint. way and structure .....	3,269,383	3,059,258
Maint. of equipment .....	4,894,269	4,745,342
Cond. transportation .....	10,179,038	10,469,806
Total expenses .....	18,929,701	18,870,301
Net earnings from operation ..	12,346,141	11,011,437

## NEW PUBLICATIONS.

*Electricians' Hand Book.*—By Prof. T. O'Connor Sloane. The Norman W. Henley Publishing Co., New York, 1905. Leather 4½x6½; 760 pages. Price, \$3.50.

Professor Sloane has written a most valuable handy reference book for electricians. It is not a collection of formulae and miscellaneous data for the designing electrical engineer, but a practical guide for those having to do with the installation, care and operation of electrical machinery of nearly every description. The author discusses theoretical considerations only far enough to explain the operation of machines and the wording of such discussions is always clear and intelligible. Practically every important application of electricity is considered more or less at length. The book is profusely illustrated with diagrams and drawings. An index covering 24 pages adds greatly to the convenience of the book for reference purposes.

*Machine Shop Tools and Methods.* By W. S. Leonard, Instructor in Machine Shop Practice and in Practical Machine Design, Michigan Agricultural College. New York: John Wiley & Sons, 1905. 6 in. x 9 in.; 554 pages; 689 figures. Cloth. \$4.00.

This is the third edition of this work. The two preceding editions were published in loose-leaf form, and, as stated by the author, served their purpose well as text-books for the students in the Mechanical department of the Michigan Agricultural College. This third or enlarged edition is presented with the hope that it may

be equally valuable in connection with engineering departments of other schools. Owing to the purpose for which this book has been gotten up, it is naturally of an elementary character throughout. The author makes no attempt at describing the proper method of tool design, nor does he attempt to teach the machinist how to use the tools; but he does give very clear descriptions and illustrations both of hand and of machine tools, and the most advanced method of using the same. The illustrations as a whole are good, especially the line drawings. There are 32 chapters and an appendix, which contains questions on the text. The first chapters are devoted to describing the different forms of measuring and laying out tools, as well as hand tools; such as rules, micrometers, gages, calipers, surface gages, hammers, chisels, files, etc. Simple machines such as drill presses are then taken up, and the author gradually proceeds to describe the more complex machines and their tools; such as lathes, boring machines, planers, shapers, key-seating machines, milling machines, grinding and polishing machines, etc. The last two chapters describe the use of jigs for making interchangeable parts, and other modern machine shop methods. The information given in the text as a whole is good and no doubt will prove of great value when used in connection with practical shop work. As in other works, it would be of help to the reader if the author

would insert self-explanatory captions beneath each cut, rather than figure numbers only. Full captions are especially desirable in books of an elementary character.

R. C. D.

## TRADE CATALOGUES.

*Hoisting Engines and Steam Pumps.*—The Allis-Chalmers Company, Milwaukee, Wis., sends an illustrated catalogue descriptive of its hoisting engines and accessories as well as two bulletins which describe and give tests of two large pumping engines. One of these is of 30,000,000 gal. capacity and is installed in the Baden high service station of the St. Louis Water Works. The other is of 15,000,000 gal. capacity, and is installed in the Chestnut Hill high-service station of the Metropolitan Water Works, Boston, Mass.

*Graphite.*—The Joseph Dixon Crucible Co., Jersey City, N. J., sends its September issue of "Graphite." It contains a number of interesting short articles in which the value of graphite as a lubricant is set forth. Illustrations of a number of prominent buildings in which the steel work has been painted with Dixon's Silica graphite paints are also shown. The second installment of W. H. Wakeman's article on "Something About Condensers" is also given, as well as the usual amount of light reading matter.

*Financial Publications.*—The Moody Corporation, New York, publishers of Moody's Manual and other financial and reference books, is distributing a neat booklet entitled "The Power of an Ideal." It tells in an interesting way about the growth of this company since its start in 1900. In the rear of the pamphlet is given a price list of the various works published by the company.

## CONTRIBUTIONS

## Double-Header Mileage and Repair Bills.

Baltimore, Md., Aug. 26, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My observation is that a good many transportation men give little consideration to the influence of double-header mileage on locomotive repair bills and that the protests of mechanical engineers on the subject are treated somewhat light-heartedly. I suggest that it will be profitable if you ask answers from your readers on the following question, viz.: Supposing two passenger engines were coupled and run constantly in double-header service on a road ballasted with gravel, how much sooner would the second engine have to go into shop for repairs than the leading engine?

ENQUIRER.

## Record Production and Delivery of Flour.

St. Louis, Mo., Aug. 25, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The Kehlor Flour Mills Company, of St. Louis and East St. Louis, on Thursday, August 17, bought two carloads of wheat then on track at East St. Louis and ordered them to its mills immediately. These cars were delivered there that night. The wheat was ground into flour on Friday, the 18th, sacked and loaded into cars that afternoon and forwarded via the Continental line from East St. Louis on the Baltimore & Ohio Southwestern, train No. 98, leaving at 7.10 p.m. The cars arrived in New York Tuesday morning, August 22, were delivered alongside the White Star steamship "Baltic" at noon, and the vessel sailed Wednesday morning, August 23d, and it is due to arrive at Liverpool on Wednesday, August 30. The flour, therefore, will be on the Liverpool market within two weeks of the time the wheat was delivered to the mill at East St. Louis. I believe this is the quickest time on record for this performance.

EDWARD HART, JR.

## How to Divert City Passenger Traffic.

New York, Aug. 26, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a city paper of yesterday or the day before there is a suggestive item to the effect that—

The plans inaugurated by the Brooklyn Rapid Transit Co. on Aug. 14, to divert traffic to South Ferry and thus relieve somewhat the congestion on the Brooklyn Bridge, have not met with much success. The loss to the company by running cars on several of the leading lines direct to South Ferry, it is said, has been \$300 a day, and if this continues the service will probably be discontinued before the end of the month. It was mainly at the urgent request of the Transportation Reform League that the South Ferry service was started, and the railroad officials, after ten days' experiment, are pretty well satisfied that it will be difficult if not impossible to devise any scheme to lessen the tide of traffic on the bridge.

"Difficult if not impossible" is the phrase to which I wish to call your attention. What is the matter with a reduction of 20 per cent. in fares? Would not a saving of a cent a ride attract a good many passengers, and do away with this "difficulty"? I mean the fare through to Manhattan, of course. Such a reduction might necessitate an unequal division of profits with the ferry boat, but would not the street railroad make money, nevertheless? If the new route should take from the bridge only such number of passengers as ought to be taken from it the carrier would lose nothing on the bridge line, for he would still be using that line to its full capacity; and the traffic on the ferry line would be clear gain. Do you see any flaw in this reasoning? Why should not the city compel a reduction? Will the street railroad publicly claim that it would be unjust for the city to deprive it of the profits which it makes from passengers who ride across the bridge on strap-hangers? If the city government has not the courage to do what I have suggested, let us turn the question around for a moment. Advance the fares over the bridge. Is not the city bound to stop the disgraceful and dangerous crowding of passengers at the bridge terminal? Would not an increase in fares accomplish this? When the other bridges and the tunnel are ready, the low fares could be restored.

S. G.

## Under-Running Third-Rail for the New York Central.

The accompanying illustrations show the details of the under-running type of third-rail with which the New York Central has been experimenting with a view to using in the electric zone around New York. The design originated with Mr. W. J. Wilgus, Vice-President of the New York Central in charge of the terminal improvements, and Mr. F. J. Sprague, and was perfected in the office of Mr. Edwin B. Katte, Electrical Engineer to the Electric Commission.

A number of advantages as regards safety, economy and re-

liability of operation are claimed for this type of third rail over the prevailing form of top contact rail, such as is used in the New York Subway, and it has received endorsement only after a careful consideration of the difficult operating conditions to be met and the relative merits of both types to meet these conditions. The drawing, Fig. 1, shows the details of the third-rail support and insulation. The rail is a special bull-head section, 70 lbs. to the yard, rolled in lengths of 33 ft. from steel having a composition which gives it high electrical conductivity. It is supported from brackets bolted to the ends of extension ties spaced 11 ft. apart. The brackets are of cast-iron, strongly ribbed, and are made of such shape as to give ample clearance to the end of the contact shoe. The insulator is U-shaped, and fits loosely over the top flange of the rail and the web so as to allow for some vertical play and to permit the rail to move freely in a longitudinal direction under expansion or contraction due to temperature changes. The sides of the insulator are slotted near the bottom edges, and a projecting shelf or lug on the face of the supporting bracket fits into the slot on the back while the bottom of the clamp fits into the slot on the outside face. This clamp fits around the side and top of the insulator, and is bolted to the top of the bracket. It will be seen that this is a simple device of few parts, each support consisting of three lag screws, one bracket, two insulators and one clamp with nut. Insulators made of a number of different mate-

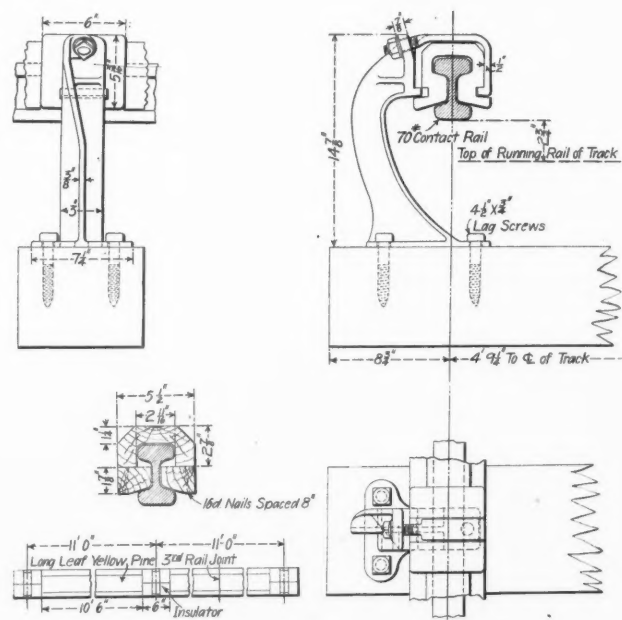


Fig. 1—Detail of Supporting Brackets and Wood Protection, New York Central Type of Third-Rail.

rials have been tried, but glazed vitrified clay seems to answer the purpose as well as any, and is cheaper.

The wood covering between supports consists of three pieces, which completely cover the top and both sides down to within  $\frac{3}{8}$  in. of the bottom of the rail. The top piece is cut from long leaf yellow pine,  $5\frac{1}{2}$  in. x  $2\frac{7}{8}$  in. It is chamfered  $1\frac{1}{4}$  in. on each of the top corners, and is slotted  $2\frac{11}{16}$  in. wide by  $1\frac{17}{32}$  in. deep on the under side to fit snugly over the top flange of the rail. The two bottom pieces fit in above the bottom flange of the rail close up to the web, and are toe-nailed to the top piece with 16d nails. This forms a smooth covering without bolts or supporting brackets, which if used might become electrified and cause death or injury if touched. The only possible way to come in contact with the rail is to reach in under the board covering.

The joints in the third rail are equally simple, consisting of two flat splice bars with two bolts and flexible bonds soldered to the ends of each rail. These joints are placed midway between supports, as shown in the sketch.

In mounting the third rail on a four-track line the arrangement and dimensions shown in Fig. 2 will be preserved. The third rails for tracks 1 and 2 will be mounted between the tracks, leaving the space on the outside and between the center tracks clear. At breaks at cross-overs and switches an under-contact incline will be used, which will be supported and protected in the same manner as the remainder of the rail. Fig. 3 shows a section of the experimental track at Hoffmans, N. Y., equipped with this type of third rail, where exhaustive experiments with a number of types have been carried on during the last year.

Fig. 4 shows the relative location and appearance of the Sub-



way or Long Island Railroad type of third-rail installation, and of the New York Central type.

For the same clearances the New York Central type requires a location of from  $\frac{1}{2}$  to  $\frac{3}{4}$  in. farther out than the Long Island type, but in order to amply clear steam railroad equipment it is proposed on the New York Central to place the rail  $1\frac{1}{2}$  in. farther out than

type are showing a tendency to split and crack where the bolts pass through, which will mean expensive maintenance. The top-contact rail, being largely unprotected from the weather, is showing a tendency to rapidly corrode, the rust falling off in flakes, whereas the New York Central type is well protected from the weather and therefore from corrosion. It has been claimed that the top-contact

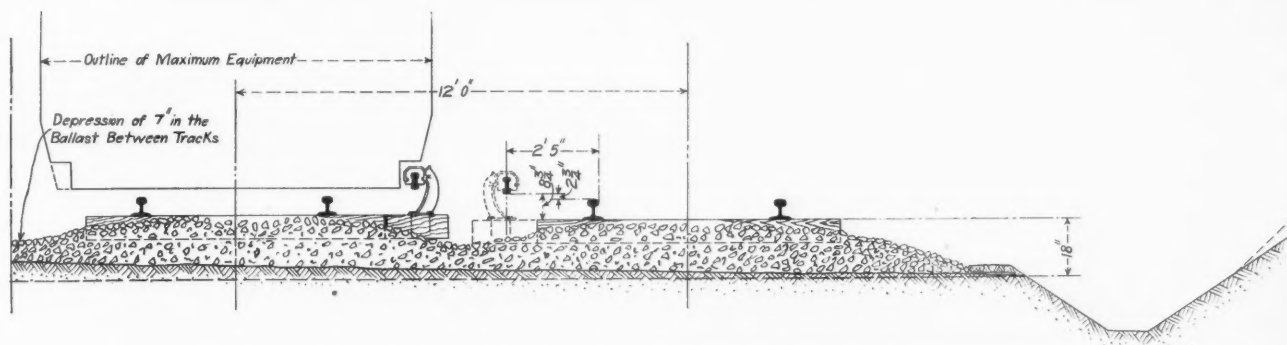


Fig. 2—Half Cross-Section of Standard Four-Track Roadbed Showing Location of Third-Rail.

on the Long Island Railroad, or a total of 29 in. This difference of  $1\frac{1}{2}$  in. is such as not to preclude interchange of equipment with a suitable shoe, which can be arranged so as to automatically pass from under-contact to top-contact, and vice versa. Experiments are now being carried out with a type of contact shoe which will work equally well with top or bottom contact. This is essential because the New York, New Haven & Hartford will, in the near future, require equipment which will interchange with the New York Central and the Pennsylvania and Long Island Railroads.

The following are the principal advantages claimed for the New York Central type of rail over the top-contact rail as determined largely from the experience gained on the experimental track.

**First Cost.**—The top-contact type of third rail omits the use of boards on the side of the rail, except at crossings, but for the purposes of this estimate the complete protection with side-boards is figured.

Top-contact type ..... \$4,325 per mile.  
New York Central type ..... 4,100 per mile.

Saving in favor of New York Central type ..... \$225 per mile.

**Maintenance.**—The New York Central under-contact type will cost much less than the top-contact type for annual maintenance for the reason that it has but 7,600 parts per mile as against 24,500 parts per mile for the top-contact type. Experience so far with the New York Central type has disclosed no breakages whatever in the clay insulators, whereas on top contact types it has been noted that a large proportion of the clay insulators are already broken and the indications are that the breakages will increase. The board protection on the New York Central type has a continuous support so arranged that it cannot crack and warp, whereas the board pro-

tection on the top-contact rail is supported at intervals. Much of it is very thin board, and consequently cracks and warps under exposure to weather, and the cost of renewals will be heavy. The vertical posts holding the protection boards on the top-contact

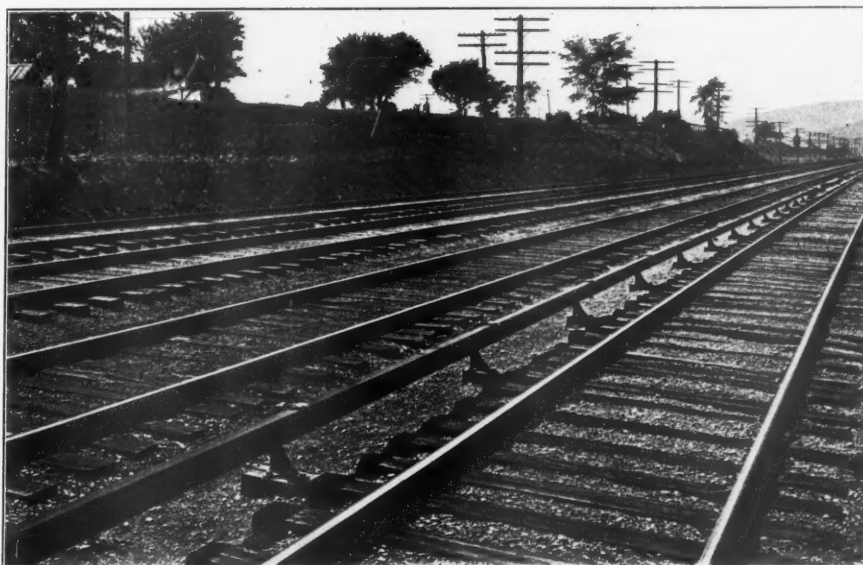


Fig. 3—Under-Running Third-Rail Installed on the New York Central's Experimental Track at Hoffmans, N. Y.

well protected that the trackmen may work with freedom and thus use their time to the best advantage of the company.

**Operation.**—The top-contact type of third rail is open to the action of sleet, whereas the under-contact type is thoroughly protected from sleet. The former has a space between the top of the rail and the underside of the protection board, which catches snow and can be cleaned out with difficulty, whereas the under-contact type will not catch the snow, and a simple projection on the ordinary snowplow will clear away the snow and keep the rail clear by the action of gravity. The top-contact type has the rail base within  $5\frac{1}{2}$  in. of the ground at the top of the tie, whereas the lowest part of the New York Central type is  $8\frac{3}{4}$  in. above the same level, and consequently further removed from snow, ice and rubbish. The construction of the New York Central type is such as to require the maintenance of a clear space between the live third rail and the ground, whereas with the top-contact type the accumulation of snow, ice and rubbish may continue without disturbance. This condition permits a considerable leakage of current, especially during the winter months, and consequently a loss of money in operation.

**Safety.**—The principal feature to be considered in the adoption of the third rail is that of safety. The top-contact type permits the edge of the rail to project nearly an inch beyond the edge of the protection board, so that in the absence of the board on the edge

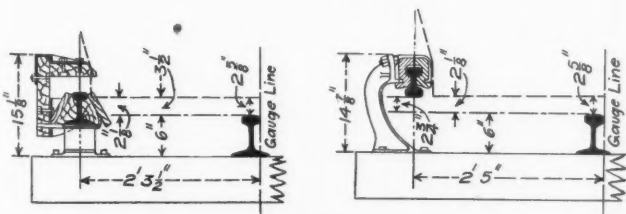
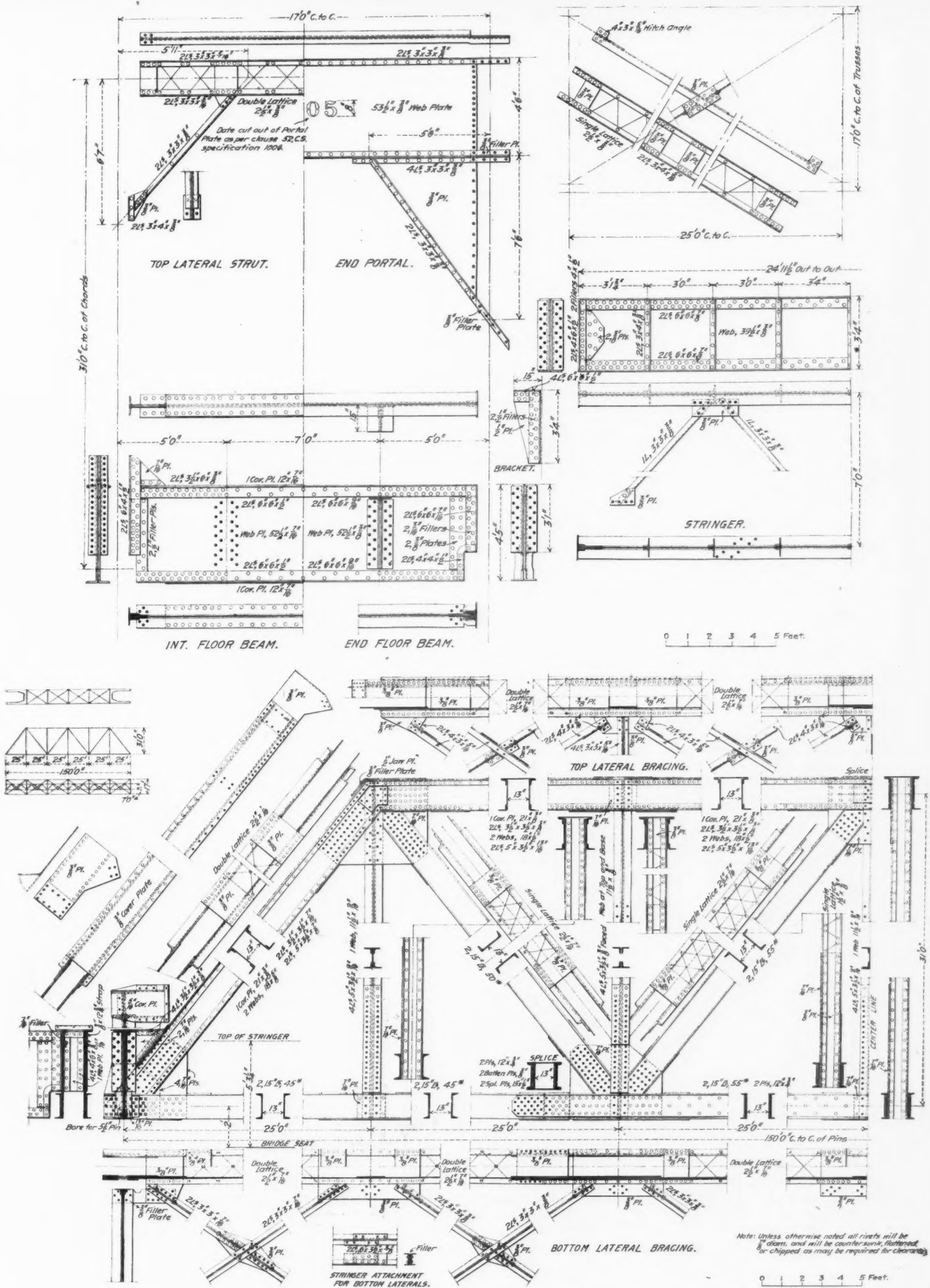


Fig. 4—Comparison of Clearances of Top-Contact and Bottom-Contact Third-Rail Installations.

tection on the top-contact rail is supported at intervals. Much of it is very thin board, and consequently cracks and warps under exposure to weather, and the cost of renewals will be heavy. The vertical posts holding the protection boards on the top-contact







Details of Trusses and Floor of 150-ft. Riveted Through Span—Common Standard, Harriman Lines.

## The Grain Crops.

Current western estimates of the wheat crop in the United States range from 624,000,000 to 700,000,000 bushels. The Ames-Brooks Co. has just issued a circular which argues for the higher figure, in addition to 80,000,000 bushels from northwestern Canada, and says that in wheat, after a year of absolute independence of foreign outlet for our product, we have undoubtedly raised a crop which means an exportable surplus and a price to conform with a foreign basis less the cost of delivering it in foreign markets. From all appearances this means an exportable surplus of 200,000,000 bushels of wheat this coming year. This means that export business must become a matter of almost daily occurrence and in a good volume both of wheat and flour to move this quantity during the crop year. As to how much this will be modified by the ability or inclination of the American farmer to hold back his crop is a matter of conjecture, but it should not be forgotten that an 80 cent wheat price in primary markets is, after all, a very fair price and a profitable one on such a yield as America has secured this year. It is also true that it is yet to be demonstrated as to the stimulation which will be given our domestic consumption by a price basis of 80 cents instead of the present basis of \$1, at which even now the first arrivals of new wheat are selling in Minneapolis. Reports from Russia are very contradictory, but it appears fairly safe to assume that their crop this year is not entirely satisfactory. It also is fairly demonstrated that the heavy shipments from Russia the past year would have been even heavier had their inland transportation facilities been equal to the task of moving the grain. It is also certain that the need for actual money by Russia will force every bushel of merchantable grain that can be moved and marketed into foreign markets as fast as their facilities can handle it.

As we (the Ames-Brooks Co.) see it, this is the situation. After two years of very low ocean grain freights there is a promise this fall of a large movement of grain (wheat, flax, corn, oats and barley), in all of which America has an apparent exportable surplus. The anticipation of this movement has already advanced ocean freights very sharply for the later fall months. It is reasonable to expect that it will cost in November 5 cents to 10 cents per bushel more to reach a foreign market from an American primary market than it does to-day on the present low lake, rail and ocean freights, all of which are certain to advance sharply. Now, if August wheat in Chicago at 80 cents is not on an export basis, what will be done with December wheat at 82 cents, and an increased cost of at least 5 cents per bushel to the foreign markets? There is only one answer. If America has the surplus wheat to sell and if the farmer insists on marketing it, either American prices must decline to meet this condition as it materializes or foreign prices must advance.

In flaxseed.—It seems almost certain that America has grown perhaps the largest crop of flax she has ever raised. Yields in the northwest are universally exceeding the estimates, and the crop is so far along that very little damage can now be feared. It seems certain that this article also must reach an export basis, and here the foreign price basis is more in doubt. Some Duluth seed was sold for export when Duluth October was \$1.25 per bushel. Since that time the foreigner has declined steadily with our declines and avoided making further purchases. With the market now 20 cents lower the foreigner shows less inclination to buy American seed than he did 60 days ago.

In rye.—Foreign requirements will undoubtedly be larger than before as there is no doubt of a shortage in the rye crops abroad. In this article, however, it is still interesting to note that in the German markets Russia is selling her new crop rye, which is supposed to be very short of the normal, at prices less than American rye can be delivered from our new crop.

Oats and barley.—Some export business is working in these every day, and with the foreign demand for feed stuffs promising to be a material factor in the price all this year, we think these articles will continue for export. The higher cost of reaching foreign markets as ocean freights advance with the wheat movement may operate against the American price in these articles.

In corn.—Foreign markets are still steadily taking old crop American corn at a price of around 65 cents in foreign markets. They are also willing to contract our new crop at 5 cents to 10 cents discount under this basis, so that there promises to be a steady market at good prices for what promises to be one of the largest crops of corn America has raised.

Summing up the grain situation in America there is everything that should please our business interests. We appear to have a good exportable surplus of all grains, for price basis is very satisfactory to the farmer and promises to draw from foreign markets to America an amount of money value which cannot help but have a favorable effect on American business this coming year.

A press despatch from Odessa, Southern Russia, says that the export grain trade is paralyzed by lack of cars due to the drafting of cars and engines by the government for military uses.

## Railroad Statistics for Year Ending June 30.

The following table compares certain statistics of the railroads in the United States for a series of years, as if they were worked as a single property. It is open to criticism on the ground that it contains some reduplication, but the comparison afforded is sufficiently accurate to be valuable. More extended comment on these Interstate Commerce Commission statistics was printed in the *Railroad Gazette* last week.

Railroad Statistics for Year Ending June 30.

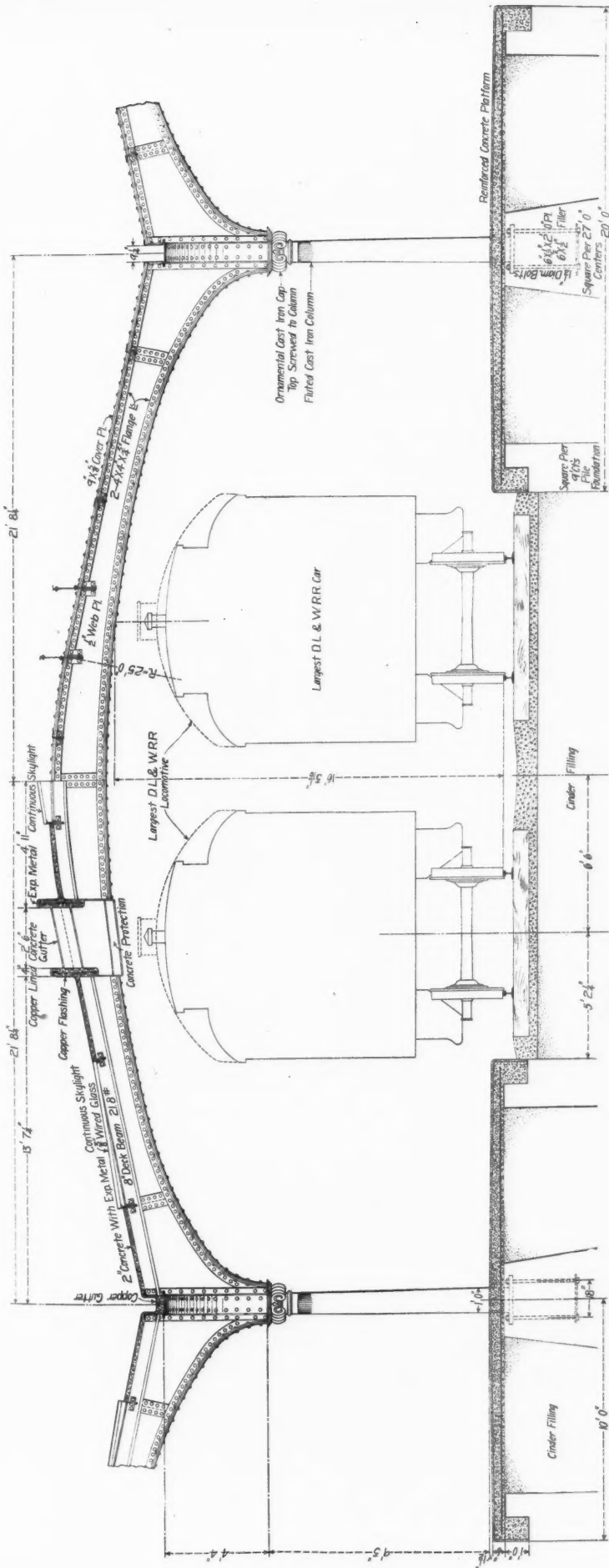
	1904.	1903.	1902.	1901.	1900.
Miles road completed.	213,904	207,977	202,472	197,237	193,346
Increase, 12 mos. ....	5,927	5,505	5,234	3,892	4,051
Mileage in hnds revrs	1,323	1,185	1,475	2,497	4,178
Locomotives, No. ....	46,743	43,871	41,228	39,584	37,663
Cars owned, pass'grs.	39,752	38,140	36,991	35,969	34,713
Cars owned, freight.	1,692,194	1,653,782	1,546,132	1,464,328	1,365,531
Cars owned, total.	1,738,561	1,753,389	1,640,220	1,550,833	1,450,838
Employees	1,296,121	1,312,537	1,189,315	1,071,169	1,017,653
Per 100 miles road	611	639	594	548	529
Total stock and fund- ed debt, millions..	\$13,213.1	\$12,600.0	\$12,134.2	\$11,688.2	\$11,491.0
Stock and debt per mile of road	64,265.0	63,186.0	62,301.0	61,528.0	59,676.0
Gross earnings, millions	1,975.1	1,900.1	1,726.4	1,588.5	1,487.0
Average per mile....	9,306.0	9,258.0	8,625.0	8,123.0	7,722.0
Pass. carried, millions	715.4	694.9	649.9	607.3	576.9
Pass. 1 mile, millions	21,923.2	20,915.8	19,690.0	17,353.6	16,039.0
Freight carried, million tons.	1,309.9	1,304.4	1,200.3	1,089.2	1,101.7
Same, 1 mile	174,522.1	173,221.3	157,289.4	147,077.1	141,590.2
Average rate per ton- mile (mills)	7.8	7.6	7.6	7.5	7.3
Average pass. fare per mile (cts.)	2.0	2.0	2.0	2.0	2.0

## A Novel Train-Shed for the New Hoboken Terminal of the Lackawanna.

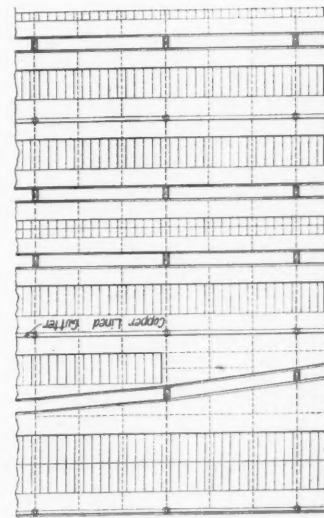
The accompanying illustrations show a novel train-shed, which was designed by Lincoln Bush, Chief Engineer of the Delaware, Lackawanna & Western, for the company's new terminal at Hoboken. It is an entirely new departure in train-shed design and the advantages claimed for it over the ordinary type of shed, with single long truss spans of steel, are: First, that its first cost, or cost of construction, is cheaper—probably 30 to 40 per cent. less; second, the cost of maintenance will be less; third, it will be lighter, and, fourth, it will be less gaseous and not so noisy. The proposed shed, as shown, consists of a number of longitudinal sections built up of structural steel, reinforced concrete and wire glass. In all cases where the steel would be subjected to the locomotive gases it is protected by concrete and by copper. The roof is supported by longitudinal rows of columns, placed 27 ft. between centers, and the maximum height of the roof spans is about 16½ ft. from the top of rail. Transverse built-up roof girders are placed between the columns and resting on these are longitudinal purlins which directly support the reinforced concrete roof slab and the skylights in it. The longitudinal opening over the locomotive stacks, shown in the cross-section, extends the entire length of the train-shed, and with the exception of the crossing of the roof girders it is entirely open. The tops of the locomotive stacks will come within 6 in. or 8 in. of this opening, and it is thought that practically all of the exhaust from them will be discharged directly through and outside of the shed. The girders and purlins directly over the smoke stack are to be encased in concrete to protect them from the gases. To protect the platform from rain and snow and to direct the gases in their passage from the stacks, a built-up section encased in a concrete slab 4 in. thick by 2 ft. 1 in. high is placed on edge on either side of the opening, as shown in the illustration.

Three continuous skylights, of wire glass, each 6 ft. wide, will be placed longitudinally in the roof of each section. The one in the middle of the section and at the peak of the roof will admit light directly to the inside windows of the cars on the track below, and the remaining two rows of skylights placed over the platform will admit ample light to the outside windows of the cars. The proximity of the skylights to the car windows will no doubt tend to produce a better light in the cars than is usually found in cars in the majority of large train-sheds. In addition to the transverse pitch which is given to the roof in both directions from the center it also has a slight longitudinal pitch between the columns. A copper gutter running longitudinally is placed over each row of columns. This is connected with a down spout, which is placed in each of the hollow vertical cast-iron columns. The majority of the ground on which the terminal is built is made ground, and to avoid any trouble from settlement the footings for the concrete platforms and the platforms themselves have been designed to avoid all difficulty from this source. Three rows of piles are to be driven under each platform, one row under each outer edge and one row down the middle. Small square piers, spaced at 9-ft. centers, will be built on the outer rows of piles and similar piers will be built on the center row of piles for the columns supporting the train-shed. The concrete platforms will be reinforced with expanded metal and will be supported by both rows of small piers as well as by the column piers. As proposed at first, and as described in the *Railroad Gazette* of March 24, 1905, the original plans of the Lackawanna terminal called for 16 tracks under the train-shed. As shown

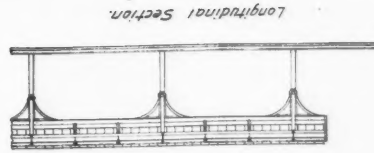
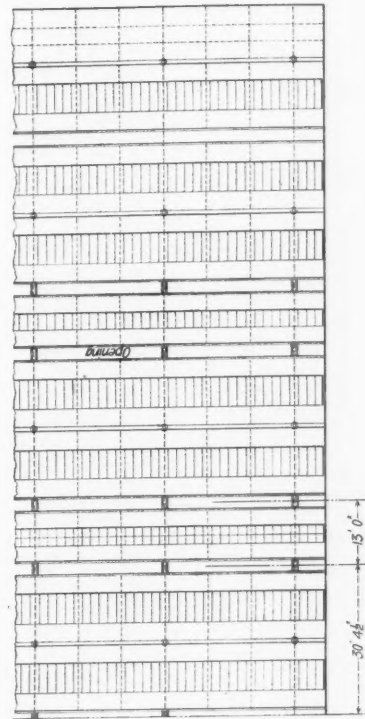




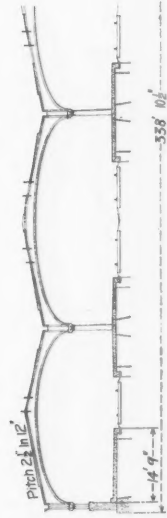
Typical Cross Section.



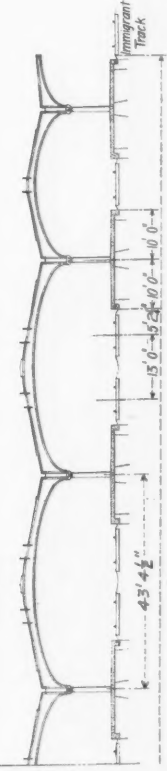
North Elevation.



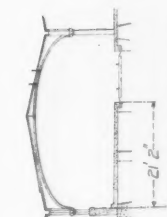
Longitudinal Section.



Transverse Section.



Section of Umbrella Shed.



Section of Truss T-4.

Proposed Train Shed for the New Hoboken Terminal of the Lackawanna.

in the accompanying plan, the new design embodies only 14 tracks. After careful consideration, it was thought better to reduce the number of tracks and to have wider platforms, rather than to have a large number of tracks and narrow platforms. This is for the reason that the number of trains which can be operated in a terminal at one time depends largely upon the rapidity in which they can be loaded and unloaded, and the wider platforms will naturally tend to a more rapid movement of passengers.

#### The New "Alton Limited."

The Chicago & Alton placed in service August 20 entire new trains for its "Alton Limited" runs between Chicago & St. Louis. No one who sees these splendid trains will be inclined to dispute the Alton passenger department's claim that they set the "high mark" in passenger equipment. The trains are in day service and are made up of six cars, comprising a mail, a composite smoking and baggage, a chair car, a dining car, and two parlor cars, one of which has an observation platform. The trains were built by the Pullman Company and embody many new ideas. In general construction they are modeled on the lines of the Pullman equipment exhibited at the World's Fair at St. Louis last year. One of the most notable differences from usual practice is in the lines of the

omitted from both smoking and chair cars, the idea being that with the ample provision for hand baggage on the floor, the overhead racks will take care of all hats, coats and umbrellas. The appearance of the car will undoubtedly be more sightly in the absence of coats and hats swinging from the walls. The chair car seats are not reclining chairs. They have the Richards panel back, but instead of a moving adjustable panel within a rigid frame, the entire back moves, being pivoted at the bottom and fitted with stiff springs, so that it adjusts itself to any posture the occupant may assume within the limits of its travel of several inches. These seats are not reversible, of course. They are upholstered in green Spanish leather.

The dining car, 62½ ft. long, is finished in "vermillion," an East Indian mahogany. It is polished to a high luster, giving a rich and elegant effect. The tables are rounded at their outer ends, affording a great improvement in appearance, besides producing the effect of greater aisle width and therefore of more room. Another novelty is the wall lights, which are set in shield-shaped sconces between the windows, there being three lamps in each enclosure. The chairs have the green leather upholstery, and the carpet is a green-shaded Wilton. The cars have accommodations for 30 persons. The kitchen is arranged to permit both front windows to be used for serving during rush periods. Ordinarily, one is for the re-



Interior of Dining Car, "Alton Limited."

deck, which is square instead of the conventional arched form. The effect is decidedly pleasing, giving an impression of roominess.

The composite baggage and smoking car is 73½ ft. long. The baggage compartment is trimmed in ash and the smoking compartment in quarter-sawn oak, inlaid with ebony and whitewood. In this car the eye is instantly attracted to the seats, which are unique in form and were designed specially for this equipment. The object was to obtain a distinctive design which would combine comfort, roominess and a suggestion of the home. They are made of natural wood and upholstered in green Spanish leather. There is ample room beneath them for hand baggage. The toilet room for the car is placed at the forward end of the smoking compartment, between it and the baggage section, instead of at the rear. The space at the back end where the toilet room is usually found is occupied by a leather-upholstered settee, there being one on each side of the car; also one at the forward end of the compartment.

The chair car is 72½ ft. long and seats 64 persons. It is finished in Mexican mahogany, an orange-colored wood. The square-decked ceiling has figured veneer panels done in two shades of light green. The aisle carpet is a soft-toned body brussels. This car, also, has a new design of seat. Unlike the usual reclining chairs, these seats stand on four legs and therefore have the same advantage as those in the smoking car, namely, abundance of room beneath for hand baggage. Hat and coat hooks have been entirely

omitted from both smoking and chair cars, the idea being that with the ample provision for hand baggage on the floor, the overhead racks will take care of all hats, coats and umbrellas. The appearance of the car will undoubtedly be more sightly in the absence of coats and hats swinging from the walls. The chair car seats are not reclining chairs. They have the Richards panel back, but instead of a moving adjustable panel within a rigid frame, the entire back moves, being pivoted at the bottom and fitted with stiff springs, so that it adjusts itself to any posture the occupant may assume within the limits of its travel of several inches. These seats are not reversible, of course. They are upholstered in green Spanish leather.

The engraving conveys an excellent idea of the interior finish and ornamentation of the parlor cars. Vermilion mahogany is used for a paneled and inlaid wainscot high enough to enclose wide observation windows with French scroll panels roundabout and above them orange-opal glass. Above the window panels is white buckram stenciled with a frieze of poppies and edged with green and gold. The ceiling contains recessed panels of the white buckram stenciled in green and gold, the clear-story panels being separated by white enameled cross-beams. The chairs are a golden brown velour and the carpet green Wilton. One of the cars, the observation-parlor, is intended more especially for men and has a large smoking room with seats for ten and a buffet adjoining. The broad observation platform at the rear end gives the proper finish to this sumptuous train.

Another new feature, shown for the first time on the World's Fair exhibit equipment, is the swinging partition in the entrance passageways of the chair cars to protect the occupants of these cars from objectionable drafts and screen from view the entrances to the toilet rooms. A floor plan of the end of one of these cars herewith illustrates the arrangement. The partition is shown in what





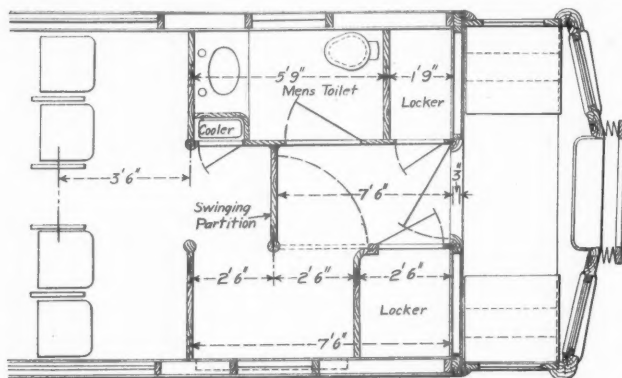
Interior of Combination Smoking Car, "Alton Limited."



Interior of Chair Car, "Alton Limited."

might be termed the "running" position, crosswise of the passage-way. To give a direct passage, when passengers are being received, for instance, the partition is swung around at right angles to its present position, as indicated by the broken lines.<sup>3</sup> It is held at either point by a latch, and may be locked in position if desired. This is the first train in service with this feature.

The train is lighted throughout with electricity and the lighting fixtures are of a unique and special design. The train is absolutely dependent on the electricity, there being no provision for any other kind of light. The current is supplied by storage batteries, the plant for each car having a capacity of 450 ampere-hours. Provision is made for interconnection of the batteries and lighting circuits of the different cars, so that no trouble will be experienced



Plan of End of Chair Car Showing Swinging Partition.

in the event of the failure of the batteries on one or more cars. The entire train can be lighted from the plant on one car. All cars are supplied with electric fans.

The new equipment was given the same exterior colors as the old, which consist of three shades of maroon stenciled in gold. The total weight of the six cars is 293 tons. Each train is equipped throughout with the Forsyth automatic air and steam coupler.

The old "Alton Limited" equipment has been placed in service between St. Louis and Kansas City, and will be known as the "Alton-Burlington Limited." It will be remembered that these two roads have a joint arrangement for a combination short route between these two cities.

#### Proper Methods in Conducting Painting Tests.\*

BY GUSTAVE W. THOMPSON.

A number of years ago the President of our society, Dr. Dudley, wrote a series of papers treating of the characteristics of paint, and, we believe, for the first time in the history of the art, attempting some scientific understanding of paint problems. Not merely were these papers the first, in our opinion, that treated of the subject of paints scientifically, but, it may be said, that since that time practically no progress has been made along this line. It is to be deeply regretted that Dr. Dudley has not had time to enlighten the public further in this direction; for, we are confident, had he been able to do so, the science of painting and paint manufacture would have been very much simplified. The situation, as it is presented to-day, is this: New paint materials are offered to the consumer, from time to time, these paint materials having more or less value, but in regard to which the manufacturers, as a rule, claim a somewhat more universal merit than these paints in actual use would warrant. It is natural for the paint manufacturer to advocate the use of his product or products for every condition under the sun, because he hopes by this broad advocacy to increase their sale. If there is one principle, however, on which the members of this society are pretty well agreed, it is that there is no complete paint which is suitable for all conditions of exposure; that is, every paint must, at least, have its various components put together in different proportions according to the conditions of exposure to which it is to be subjected.

We believe that it is the business of the engineer to design the paint which he is going to use under any given conditions. We believe that the paint manufacturers are only too anxious to supply what the engineer may demand. If the engineer starts out to select a paint, his proper attitude is not to take any one of the prepared paints on the market and specify that, because the manufacturer tells him it is the best for the purpose in question; but it is his duty to make such experiments as are practical for the purpose of finding out what paint is the best for the conditions to which the paint surface is to be exposed. To examine a paint on a large scale is, of course, the most satisfactory way provided the paint turns out well. We are unquestionably of the opinion that the surest

proof of a paint is its use, just as we are confident that the best way to detect a poison is to take it internally. The unfortunate part of the matter is, however, that the use of the paint in order to find its value may leave the user firmly convinced that this value is a negative quantity. Supposing that he is able to try a paint in a limited way on full-sized structures, and the result, while not a minus result is really very nearly that—that is to say, suppose the result leaves him somewhat in doubt, how is he going to tell whether the fault lay in the paint or its method of application? How can he be sure that the relative failure of the paint may not have been due to inherent destructive conditions external to the paint itself but peculiar to the structure painted? A painting test of this kind, properly called a "field test," is of inestimable value when accompanied by tests conducted under conditions all of which are known. These are what may be called "laboratory tests," and, if conducted with care and parallel to field tests, they act as a check upon the results obtained by these field tests and give a better basis on which to rest scientific conclusions. These laboratory painting tests, made with the intent of exposure under service conditions, should be supplemented by other laboratory tests which should parallel information enabling the engineer or paint chemist to determine the relative value of a given paint in advance of the results which are obtained by field or laboratory tests under service conditions. We must not reverse this order, however, and attempt to substitute purely chemical tests for exposure tests under service conditions until the laboratory tests have demonstrated their value.

By the term "painting tests" in our title, we have intended to include those tests which can be conducted with scientific accuracy, but which, at the same time, are as close as possible to ordinary practice so long as this accuracy is not impaired. Unfortunately, tests supposedly of this kind are in most cases without value. So much is this the case that laboratory painting tests are often spoken of in words of derision, as though they could be made to produce any result desired by the skillful manipulator of the brush. In most cases these painting tests are made by persons interested in exploiting certain products, whereas they should be conducted principally by the consumer. The primary cause for the lack of value which these painting tests usually show is that they are not conducted with sufficient accuracy. Tests of this kind should be conducted under the supervision of a competent engineer or chemist and with as much care as if a chemical analysis were being made.

Committee E has outlined a method of conducting painting tests for protective coatings, this method demanding proper attention to all those details which are essential to the obtaining of accurate results. These tests, when carried out by the sub-committee having them in charge, should prove of inestimable value. There are other paints, however, which, though "protective," are used for the purpose of producing a desired finish of appearance. Most paints are of this kind, and I propose, with your permission, to say a few words about painting tests made, using this class of paints:

Let us, to start with, take the question of the relative "covering power" of paints. To my mind, the term "covering power" has only one proper meaning; that is, the power to hide the surface painted. It is, as Dr. Dudley has pointed out, a function, first, of the light-destroying or absorbing power of the constituents of a paint, and, second, of the difference in refractive index between the pigment and vehicle. Whatever it may be caused by, however, we are more interested in the actual facts of the case than the reasons therefor. In comparing two paints for covering power, it is generally understood that these two paints should have practically the same color and be very nearly alike in tone, for the eye is not able to note accurately the difference in covering which exists between paints of different colors or tones. When we compare two paints of the same color and tone for covering power, our work is somewhat simplified when it is borne in mind that very few paints are homogeneous as regards pigment. Most paints contain several pigments, the principal one being a white pigment of some kind. Only with straight white or dark colors is the pigment likely to be homogeneous. Furthermore, with the colored paints consisting largely of white pigment, the tinting material is so fine that only a very small amount is usually needed to give the tint desired. In this case the actual covering power of the paint is principally dependent upon the white pigment present. Our greatest interest, therefore, centers around the covering power of white paints; for, when we wish to design a paint of a certain color, we usually select a given white paint and add to it such coloring materials as have the highest possible tinting power and of which, consequently, we have to add the least amount possible. The result is that, practically speaking, tests for covering power are demanded for white paints only, and it is of these that I desire to speak.

On the threshold of our inquiry, we are confronted by two difficulties: The first of these has to do with the amount of vehicle we are to use to get the "consistency proper for painting." In the present state of the art, there is apparently no method for determining this consistency; the consistency proper for painting is simply a matter of rule of thumb. There is nothing standard about this consistency; it may be one thing in winter, another in summer;

\*From a paper read before the American Society for Testing Materials, Atlantic City, June 30, 1905.



one thing with a flat brush, another with a round brush, and still another with the squirt gun. We have a refuge, however; and that, it seems to me, is the only safe one. When we have mixed our paint to a "consistency proper," in our opinion, "for painting," let us record the formula on which we prepared the paint and let our report state this formula in full detail. If the paint was a prepared or ready-mixed paint, then the analysis of the paint should also be reported in as nearly formula form as possible. In other words, we may have difficulty in determining what is the consistency proper for painting, but we need have no difficulty in recording the composition of the mixture which was used in making a given test for covering power; and this, in the present state of the art is all that we can ask. The second difficulty which presents itself is in the adoption of a spreading rate per gallon of paint. There can in practice, of course, be no standard spreading rate; and yet we have found that any white paint which has, according to our experience, a consistency proper for painting can be readily brushed out so as to cover 1,200 sq. ft. to the gallon of paint when applied to a fairly smooth surface; and, in most cases, if it is not spread out at that rate the paint will run. We solve this difficulty of the spreading rate at which the paint is to be applied in the same way that we solve the difficulty in connection with the consistency proper for painting; that is, we simply make the spreading rate followed a matter of record. To illustrate, let us suppose that we have received two paints which we desire to compare for covering power; these paints we will say are prepared paints—that is, they have been thinned to "consistency proper," in the manufacturer's opinion, "for general painting." We would, first of all, analyze these paints to determine the formulae on which they were prepared. Inasmuch as the pigments in the two paints may vary in composition and, consequently, in specific gravity we make a determination of the weight per gallon of paint as received; and, knowing the percentage by weight of the vehicle present, we calculate the percentages by volume of vehicle and pigment present, which gives us a somewhat better conception as to the nature of the paints. All the information we have thus obtained is recorded. Our next step would be to compare these two paints as to the relative ease with which they can be spread over the same area, without any particular regard to their covering power. If we find that they can be spread over the same amount of surface, without, as is usual, great difficulty, we adopt a standard spreading rate for the two paints—say, 1,200 sq. ft. to the gallon, one coat—and apply the paints to standard prepared surfaces at that rate; and, when we are through, we compare the paints for their covering power, or power to hide the surfaces painted. Now let us compare this method of making a painting test for the covering power of white paints with the method usually followed: Jones has a paint that he wants tested. He takes it to his friend Brown, the painter, and wants his opinion. Brown reports in a few days that the paint he received from Jones covered better than any paint he had ever used. Now, Brown may have been perfectly honest in making this report to Jones; but, unless the formula on which the paint was mixed and the rate at which it was spread is given, Brown's opinion is worse than useless.

We describe here more in detail our method of comparing white paints for covering power:

Use white pine boards, 30 in. long x 10 in. wide and, approximately, 1 in. thick. Each end of the board is provided with a cleat having a tongue fitting into a groove on the end of the board and securely nailed on. The entire board, including the cleats, to be finished to the size given above. Three of these boards are primed with, we will say, the following paint mixtures: White lead paste, 100 lbs.; linseed oil, one-third boiled, 75 lbs. No attempt is made to secure a definite amount of priming paint to the unit of surface; this, for the reason that the boards may vary considerably in their absorptive power. When this priming coat is dry, each board receives a diagonal stripe of lampblack in japan about 1 in. wide on one or both sides of the board, as may be desired. When this black stripe is dry, it is given a second coat of paint mixed to a consistency proper for painting, the formula being recorded. The weight per gallon of the paint so mixed is then obtained by finding its specific gravity and multiplying by 8.33, which gives the weight per gallon. Inasmuch as the board which we are using has a total surface of 680 sq. in., all we have to do is to find what the ratio is between 680 sq. in. and the spreading rate at which we desire to apply the paint in order to find the fraction of the gallon which we wish to apply to each board. If the rate adopted is 1,200 sq. ft. to the gallon, then we get the formula:  $680 \text{ sq. in.} : 1,200 \text{ sq. ft.} :: 1 : x$ , the reciprocal of "x" being the fraction of a gallon of paint to be applied to each board, one coat. Having the weight of the paint per gallon we easily get the amount of paint by weight to apply to each board, one coat on all sides. When this second coat of paint is thoroughly dry a similar coat is applied; and, when dry, the boards can be compared for the covering power of the paints on them. We mention the painting of three boards with each paint to be compared. The purpose of this is that variation in results are obtained between boards which are apparently painted in an identical manner. These variations are not great, but it is thought best to eliminate them, to a certain extent, by painting three boards

and selecting the one giving medium results for comparison with boards painted with other paints.

Tests conducted along these lines, we believe, will give valuable and scientific results and will enable the intelligent person to draw safe conclusions.

Let me state here, by way of illustration of the usefulness of this method, one of the results obtained by tests comparing pure white lead and linseed oil with a mixture of white lead and a small amount of barytes with linseed oil. The pure white lead was mixed on the formula of 100 lbs. of white lead paste to 30 lbs. of linseed oil; two mixtures containing barytes were made on the same formula as the white lead and pure linseed oil, except that to the pure white lead was added an amount of barytes corresponding to 10 per cent. by volume of the white lead present and the amount of oil was also increased 10 per cent., so that the mixed paint contained in each case the same percentage of pigment by volume and the same amount of oil by volume. Another mixture was made, adding 20 per cent. by volume of barytes to the sample of white lead paint and a corresponding amount of oil. These three paints were then compared by the above method for covering power and spread at the uniform rate of 1,200 sq. ft. to the gallon. The result was that both paints containing barytes showed a very perceptible diminution in covering power. Now, this illustration has not for its purpose the saying of anything in favor of white lead and against barytes, but simply to show that if the statement is made that a small percentage of barytes can be added to white lead without impairing its covering power, some explanation must be made as to the method by which such a result is obtained. If in any painter's hands the result has been found that the addition of a small percentage of barytes did not impair the covering power of the white lead, it must have been due either to the fact that less oil was used or that less surface was covered per gallon of the paint containing barytes than by the straight white lead.

Perhaps the most important test that can be applied to paints is a durability test—that is, a test as to the permanency of the paint film itself. Boards painted, as in the making of the covering power tests described above, can be exposed to the weather and the durability of the paint films observed. Durability tests, to be of value, should be conducted with the same care as the covering power tests. The formulae on which the paints were mixed should be recorded, also the rate per gallon at which they were spread.

Quite recently, painting tests with a view to observing the durability of various paints were reported on to the International Association of Master Painters and Decorators and the results obtained were published generally in the paint journals. Undoubtedly, these tests were conducted conscientiously and the conclusions reported give honest opinions about the results obtained. We feel, however, compelled to question these results for several reasons which appear to me to be very important. In the first place, single boards only were painted with each paint and exposed. At least three boards should have been painted and exposed alongside of each other, and the board which showed results about the average of the three should have been selected for comparison with other paints similarly selected. Very frequently it will be found that two boards painted apparently in the same manner and with the same paint will show differences in results due to differences in the boards themselves. In the second place, the formulae on which the paints were mixed are not stated with sufficient detail. In the third place, there is no information given as to the spreading rate at which the respective paints were applied. Considering any two of the boards, the paint on one board may have been twice as thick as on the other, for all we know to the contrary. We have very little doubt that the thicker the paint film, the greater its durability. This emphasizes the importance of having painting tests conducted under the supervision of the engineer or chemist. The ordinary master painter is, we believe, thoroughly competent to interpret results and to conduct field tests on full-sized structures; but, when it comes to preparing boards for exposure, special training is required, such as the chemist or engineer only can be said to have.

To conclude, no matter what the painting test may be, whether it be of colored paints or white paints, whether it be with homogeneous or mixed pigments, whether it be for covering power or durability, the essential features that we should insist upon are that the formula of the paint should be stated fully; that the thickness of the film—or what is the same thing, the rate at which the paint is spread—should also be stated. These two requisites of proper painting tests should also be demanded in all tests for the permeability of paint films or their permanency, no matter how these tests may be applied. If we wish to compare two paint films for their permeability by the dextrine test, we should know, to start with, that these two films have approximately the same thickness. It is a safe assumption that the thicker the paint film, the less its permeability. If we desire to compare two paint films for their permanency, we should know that these two paint films are of the same thickness, as the elasticity and general life of the film are proportionate to its power of resistance to oxidizing influences, and the thicker the film, the more permanent are its inner parts.





Form 217.

6-29-05. 30M

# Chicago and North-Western Railway Co.

## 21 DELAYED CARS FORWARDED REPORT.

The following cars, way-billed TIME FREIGHT, which have been delayed, were forwarded from

Station, \_\_\_\_\_ 190\_\_

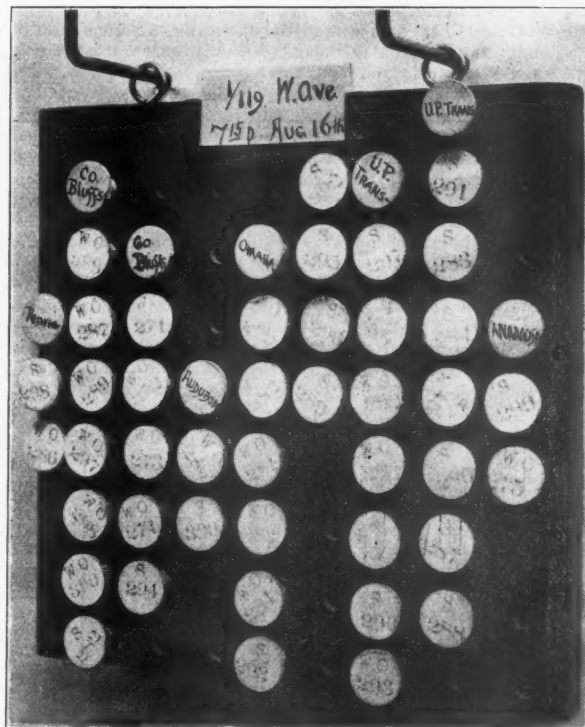
CODE LETTER AND NUMBERS			TIME FORWARDED	TRAIN NUMBER
Code Letter.	From Lowest Number	To Highest Number		
B	C	D	F	G
			M.	
			M.	
			M.	
			M.	
			M.	
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			M.	
			M.	

(A) \_\_\_\_\_ Yardmaster.

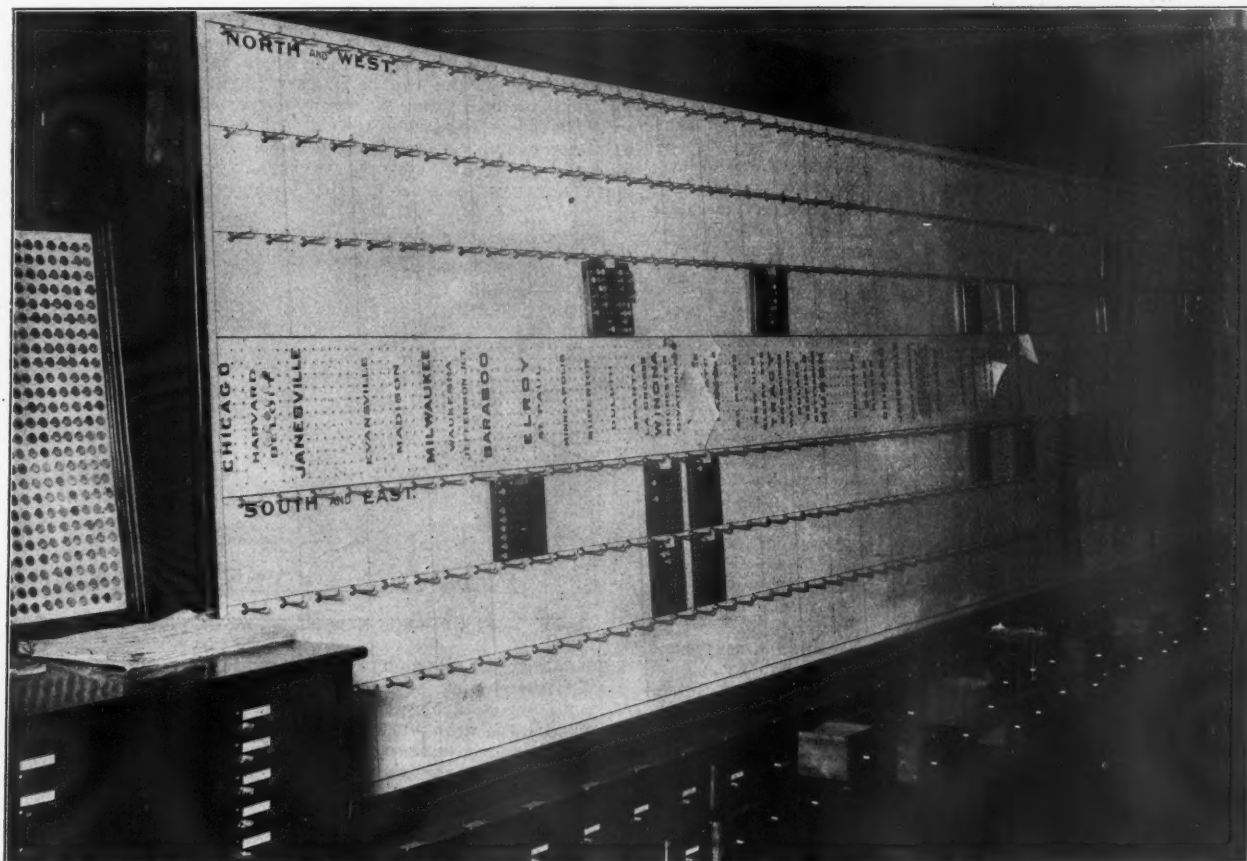
(B) \_\_\_\_\_ Agent,

This form will be used by Agents and Yardmasters to report to Car Service Agent the forwarding of cars loaded with Time Freight, which have been delayed for whatever cause, when not sent out in proper train.

Delayed Car Report.



Enlarged View of Train Board.



Graphic Method of Keeping Track of Time Freight, Chicago & North-Western.

does not differ in any material particular from the St. Louis & San Francisco report covering the same thing, except in this alone, that an effort has been made to print each of the Frisco reports on a different colored paper as an additional means of glance identification. This is not done on the North-Western, except that the time freight card waybill is red and the foreign car home route and record card is green.

Perhaps the most characteristic and interesting part of the Chicago & North-Western method is the neat and graphic time freight car and train record, which is illustrated in the accompanying photographs. On receipt of the "15," or consist, report in the car service agent's office, showing the forwarding of time freight in a certain train, a train is made up on a board, 7 in. x 7 1/4 in., which is bored full of holes to contain the plugs which are marked with the code letter and number corresponding to the code letter and number assigned to each coding station. After this train is made up it is hung on the board between the terminals, in accordance with the location of the train. This board remains in this location until its train is reported out of the next terminal, when the board is again moved. On arrival of the train at some terminal a "17" report is received, showing arrival of the cars and delivery to con-

817
40M. 12-9-03

TIME FREIGHT

FROM
DATE

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TO
DATE

Time Freight Card.

necting lines, when the board is taken off and the codes distributed in cases provided for this purposes. If a car is set out between terminals, or fails to go forward from a terminal in its proper train for any reason whatever, a "19" set-out report is made and this report is plugged, together with the code letter, number and destination in the board at the point where the car is set out and remains there until a report is received showing forwarding. A car of time freight which has started must appear somewhere on the board, either in a train, in a terminal yard, or set out at some intermediate station. After the "15" and "17" reports are checked with the board they are filed in the drawers shown, for reference. The accompanying forms show the time freight card waybill and the record of it; two forms which are quite simple and complete in the North-Western system. The foreign car home route and record card, which is also shown, is a rather uncommon form. This card, as stated, is green.

For particulars of this system we are indebted to the courtesy of Mr. R. H. Aishton, Assistant General Manager, and Mr. E. E. Betts, Car Service Agent.

#### National Railroad Commissioners' Convention.

The seventeenth annual convention of the National Association of Railroad Commissioners was held at Deadwood, S. Dak., August 16 and 17. Twenty-three states were represented by about 50 commissioners, assistants and secretaries. According to one of the speakers, no member of the Interstate Commerce Commission was present. Addresses were made by Governor Elrod, of South Dakota; President Ira D. Mills, of the Association, and others. The first report presented was one suggesting improvements in the annual statistical forms for reporting expenditures on maintenance of way and maintenance of equipment. The proposed changes were in the line of simplification and of including items sometimes treated as doubtful. For example, in M. W. it is proposed to include replacement of all buildings, including cost of additional buildings necessary to operation of property; in maintenance of equipment, replacement of shop tools, including tools necessary to maintain all equipment up to the general standard of efficiency. Objection was made on the ground that this would make it too easy for railroads to use income for permanent betterments. No definite action was taken.

A proposition was made to ask Congress to give precedence in Federal courts to cases looking to the enforcement of state railroad commissioners' orders and orders of the Interstate Commerce Commission in which the government is not a party. After considerable objection the resolution was carried.

There was a long discussion on railroad taxation and plans

for ascertaining the value of railroad property; and, as usual, a great variety of facts and views were brought out. No action was taken, the subject being referred back to the committee (which, however, will not consist of the same men as last year) with instructions to report, if possible, a plan for a uniform system of railroad taxation.

What powers should be granted to railroad commissioners was again discussed, but naturally no agreement was reached, as representatives of the "strong" and of the "weak" commissions cannot agree with each other. Uniform classification was again thrashed over, the committee varying its repeated recommendations by proposing a plan to divide the country into 12 sections, each to have an equal railroad mileage, each to have a representative on a committee which should prepare a classification in two years, then allow one year for objections, then another year to consider the objections, and then—presto, the thing is done.

Interstate Commerce Commissioner Clements made a report summarizing the laws which have been passed on railroad topics by the several states within the past two years, and the recommendations for legislation which have been made by state railroad commissions. The committee on the Interstate Commerce law recommended nine amendments to the present law, embracing the usual propositions to give authority to establish rates, to regulate private car lines, etc.

The President of the Association for the ensuing year is Commissioner W. G. Smith, of South Dakota, and the next meeting is to be held at Washington, D. C., April 2, 1906. At that time it is proposed to devote four days to business sessions.

#### Railroad Shop Tools.

(Continued.)

##### LATHES.

The accompanying illustration, Fig. 1, shows the latest design of 40-in. x 40-in. planer made by the New Haven Mfg. Co., New Haven, Conn. These machines are made in two sizes, which plane 10-ft. and 12-ft. inside of the pockets respectively. They are designed for the heaviest class of work. The beds are very deep and wide and are strongly braced; the table is wide and thick and has deep ribs; the three T slots are planed out, and holes are drilled. The driving motion is by two belts, one on each side of the machine, thus giving a very steady motion; the gearing is contained entirely within the bed and is mounted on short steel shafts of large diameter, running in cap boxes. The cross bars are very deep, are strongly braced, and can be quickly raised or lowered by power by friction clutch from the main driving shaft, as shown in the cut. The cross-feed screws are cut with double threads giving rapid adjustment, and the bronze cross-feed nuts can be taken out when necessary to renew them without removing the saddle from the cross bar. The heads are provided with vertical, cross and angular

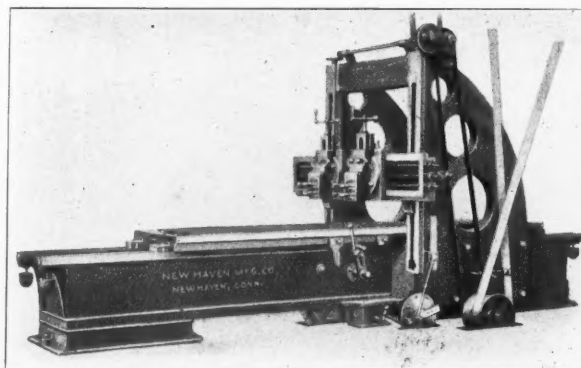


Fig. 1—The New Haven 40-in. Planer.

automatic power feeds. They are under full control of the operator from either side of the machine, and can be adjusted in any direction without disturbing the feed pawl. The table can be run back to examine the work without changing the position of the dogs, and the feed can be instantly changed from nothing to the coarsest without stopping the machine. All gears and racks are cut from the solid stock, and shafts and screws are of steel, with nuts case-hardened. The table has four wipers attached which lubricate the V's and keep them clean; the waste oil is caught in detachable cups on the bed, and can be again used in the wipers. Three sets of friction rolls are also provided running in oil pockets in the bed. When desired, cross-bars of suitable length for double heads can be furnished, so that the extra head can be run aside and the remaining head plane the full width of the machine. Heads with



automatic power feeds for one or both uprights can also be furnished, if desired. The driving pulleys on the counter-shaft are 16 in. in diameter by  $4\frac{1}{4}$  in. face, and should be run at  $14\frac{1}{4}$  r.p.m. to give a cutting speed of 1 ft. per minute.

Fig. 2 shows a 36-in. x 12-in. frog and switch planer, made by the Putnam Machine Co., Fitchburg, Mass. This machine is especially adapted to planing frogs and switches. The bed is deep and is reinforced by a heavy base which extends entirely around the machine. The side walls are tied with box girders and between the housings and supporting the bull wheel the bed has double walls. The ways have a sectional bearing of  $6\frac{3}{4}$  in., an angle of 45 deg., and a spread of  $27\frac{1}{4}$  in. Ample oil reservoirs and automatic disc oilers are provided for lubricating the tracks and side gibs. The platen is  $32\frac{3}{4}$  in. wide and 7 in. deep, and is provided

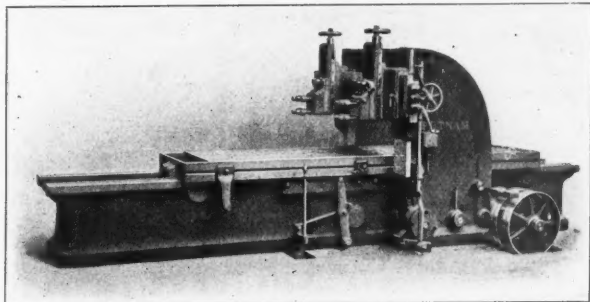


Fig. 2—The Putnam 36-in. Frog and Switch Planer.

with adjustable gibs which receive the pressure of side cuts and prevent the table from lifting. The racks are 9 in. wide, are cut from the solid, and are secured to the platen by bolts and dowels. The driving mechanism consists of forged steel shafts, 34 in. driving pulleys,  $2\frac{3}{4}$  in. face, and a train of steel gearing powered 150 to 1. The main driving shaft is supported by four massive bearings fitted with phosphor bronze bushings. The driving and reversing pulleys have anti-friction, self-oiling bushings. The pulley shaft pinion has spiral cut cogs, which impart a quiet, smooth and even motion to the platen. The table has quick return and can be operated from both sides of the machine. The cross-rail is  $15\frac{1}{2}$  in. deep and is stiffened by two heavy ribs between the housings. It is fitted to each housing on four sides and secured to the same by lock gibs and six large steel housing bolts, which locate

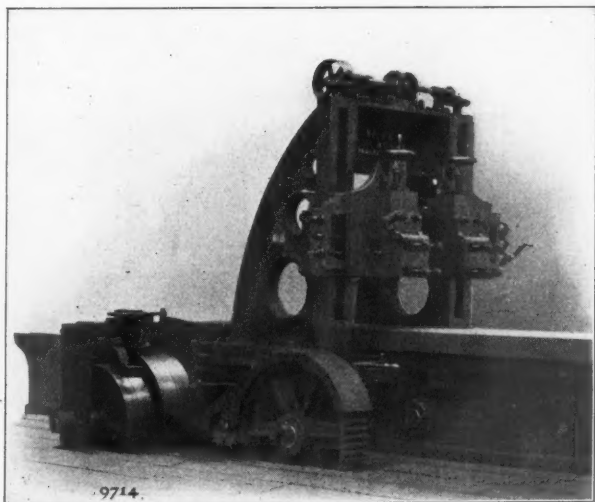


Fig. 3—The Nile-Bement-Pond 36-in. Frog and Switch Planer.

the cross-rail 9 in., 12 in. and 14 in. in height from surface of table. The cross-rail is extra long, so that one head may be run entirely out of working range. The heads are specially designed to meet the enormous strain incident to this class of work. The saddles are arranged to permit the heads to come into close proximity. Each head has a vertical traverse of 10 in., either by hand or power; also hand or automatic independent horizontal movements across the beam. The feed mechanism can be operated while the machine is in motion and will operate at either end of the stroke. The housings have an  $8\frac{1}{2}$  in. face and are of web-box form. The weight of the planer, fitted with a 12-ft. platen is 28,000 lbs. The machines are also made for platens with lengths of 14, 16 and 18 ft.

The 36-in. x 36-in. frog and switch planer shown in Fig. 3 is made by the Niles-Bement-Pond Co., New York. This ma-

chine stands at right angles to the line shaft, and the power is transmitted by a heavy train of spur gearing which is all cut from the solid. The cutting power is about equal to that of the usual 8-ft. planing machine and all parts are proportionately heavy. The table is gibbed down to the bed so that lifting or side movement is impossible. The machine can be handled from both sides. The housings, cross-rail and heads are all extra wide and heavy. The saddles are also wide, but are made right and left to allow the tools to come close together. The tool-slides have power, cross and down feeds, but no angular setting. The tool-boxes have small angular setting to clear tools. The cross-rail is provided with power elevating gears, but if desired the elevating mechanism on the cross-rail can be omitted and the housings made shorter; in which case the machine will plane only 12 in. high, as the cross-rail is then bolted to the housings.

(To be continued.)

#### All-Electric Interlocking.

The General Railway Signal Company has, during the present year, erected 30 "all-electric" interlocking plants (or has furnished the material for such plants, to be put up by the railroad companies), and an officer of the company has given us the following list of these plants with the sizes of the machines. Following this list is one of 26 places for which the company's all-electric apparatus has been ordered, but is not yet fully installed:

#### Plants Installed During 1905.

Place.	Road.	No. spaces in machine.
Lynchburg, Va.	Norfolk & Western	56
Centerville, Ill.	Terminal R. R. Assn. of St. Louis	72
Champaign, Ill.	Illinois Central	32
Gilbertsville, Ky.	Illinois Central	16
Harriman Junction, Tenn.	Cincinnati, N. O. & T. P.	24
Hinton, Va.	Chesapeake & Ohio	12
Coalburg, Va.	Chesapeake & Ohio	24
Fourth Ave., Saginaw, Mich.	Pere Marquette	64
Washington Ave., Saginaw, Mich.	Pere Marquette	44
Fort St., Detroit, Mich.	Pere Marquette	32
Eldorado, Kan.	Atchison, Topeka & Santa Fe	24
Algoa, Texas	Atchison, Topeka & Santa Fe	48
Bakerstown, Pa.	Baltimore & Ohio	16
West Columbus, Ohio	Baltimore & Ohio	56
Bellaire, Ohio	Baltimore & Ohio	28
Wilders, Ind.	Erie	36
Morton Grove, Minn.	Chicago, Milwaukee & St. Paul	44
Lake, Wis.	Chicago, Milwaukee & St. Paul	40
Franksville, Wis.	Chicago, Milwaukee & St. Paul	40
Ranney, Wis.	Chicago, Milwaukee & St. Paul	56
Atlanta, Ga.	Atlanta Terminal Co.	184
Pana, Ill.	Cleveland, Cin., Chi. & St. Louis	112
Lawrenceburg, Ind.	Cleveland, Cin., Chi. & St. Louis	28
Ashmore, Ill.	Cleveland, Cin., Chi. & St. Louis	12
Kedzie Ave., Chicago, Ill.	Chicago & North-Western	104
Melrose Park, Ill.	Chicago & North-Western	20
Florence, Ala.	Southern	20
Marion Ave., Allegheny, Pa.	Pennsylvania Lines	72
Willows, Ill.	Pennsylvania Lines	112
Indiana Harbor, Ind.	Indiana Harbor	120
		1,556

#### Ordered, but Not Installed.

Place.	Road.	No. spaces in machine.
Portage, N. Y.	Erie	32
Bridgeport, Chicago, Ill.	Chicago & Alton	80
Crawfordsville, Ind.	Cleveland, Cin., Chi. & St. Louis	44
Superior Junction, Wis.	Chic., St. Paul, M. & O.	28
Hawthorne, Ill.	Chicago, Bur. & Quincy	56
Barboursville, Va.	Chesapeake & Ohio	28
Newport News, Va.	Chesapeake & Ohio	24
Wadsworth, Ill.	Chicago, Mil. & St. Paul	40
Deerfield, Ill.	Chicago, Mil. & St. Paul	40
Ada St., Chicago, Ill.	Chicago & North-Western	32
Greene St., Chicago, Ill.	Chicago & North-Western	28
De Kalb, Ill.	Chicago & North-Western	48
Garth St., Hamilton, Ont.	Toronto, H. & B.	88
Cumminsville, Ohio	Baltimore & Ohio	48
Youngstown, Ohio	Baltimore & Ohio	48
Shoemaker, Ohio	Toledo Ry. & Terminal Co.	20
West Penn Junction, Pa.	Pennsylvania Lines	80
Rochester, Pa.	Pennsylvania Lines	56
Ford St., Chicago, Ill.	Pennsylvania Lines	104
Baden, Pa.	Pennsylvania Lines	56
Freedom, Pa.	Pennsylvania Lines	44
Bellevue, Pa.	Pennsylvania Lines	52
Ashtabula, Ohio	Lake Shore & Mich. Southern	120
East Toledo, Ohio	Lake Shore & Mich. Southern	100
Erie, Pa.	Lake Shore & Mich. Southern	56
Broad St., Columbus, Ohio	Toledo & Ohio Central	72
		1,424

#### Repairing Worn Coupler Knuckles.

At the recent meeting of the Master Blacksmiths' Association, Mr. D. B. Swinton, Canadian Pacific, described a method of repairing worn-out coupler knuckles which has been successfully used on more than 1,000 knuckles on that road. The method applies to the repair of old knuckles having the link slot and coupling-pin hole. When a knuckle wears away on the pulling face to within  $\frac{1}{4}$  in. of the coupling pin hole it begins to flatten out and becomes unfit for use. To restore the proper contour the wearing face of the knuckle is heated in a forge around the coupling pin hole while the knuckle pin hole and the tail of the knuckle are kept cold. When heated to a moderate red heat a piece of  $1\frac{1}{2}$ -in.

round iron, about  $\frac{3}{4}$  in. longer than the depth of the knuckle is driven through the coupling pin hole. It is then put back in the fire and reheated, when it is again removed and the ends of the round iron riveted down. The knuckle is then placed under a steam hammer, with the wearing face resting on a forming die in the bottom block. A few light blows will close up the knuckle and restore the proper contour at the gage points. It is then tried with a standard gage in a new coupler and also tested with a new knuckle to make sure that it will lock with other couplers. A blacksmith and helper can repair from 25 to 30 knuckles a day in this manner, and when so repaired the wearing face will last as long as the other parts.

#### Economic Depth of Bridge Trusses and Depth for Greatest Stiffness.\*

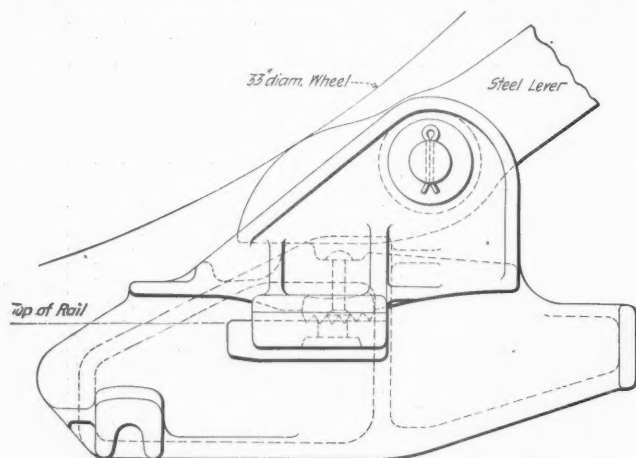
BY MANSFIELD MERRIMAN.

The fact that there is a certain depth for a bridge truss which renders the quantity of material a minimum has long been known, and the marked increase in the depth of bridge trusses which has occurred during the past quarter of a century is due to the efforts of manufacturers to use the least possible amount of material. It has generally been supposed that the vertical deflection of a bridge under a moving load decreases with the depth, and this is true for plate girders. For a truss, however, investigations made by the author show that the least deflection and hence the greatest stiffness increases up to a certain limit, as the depth increases, and then decreases, so that there is a depth which gives the truss its greatest vertical stiffness.

The following are the results obtained by the author for the type known as the deck Pratt truss. Let  $l$  be the span,  $d$  the depth,  $p$  the panel length, and  $n$  the number of panels, so that  $l = np$ . The economic depth was obtained by forming an algebraic expression for the amount of material in the truss in terms of its dimensions, given loads and allowable unit-stresses, and then finding the value of  $\frac{d}{p}$  which renders that expression a minimum. There were found, for

$n$	= 4	8	12	20	30
$\frac{d}{p}$	= 1.29	1.73	2.08	2.65	3.21
$\frac{d}{l}$	= 0.32	0.22	0.17	0.13	0.11

which shows that  $\frac{d}{p}$  increases with length of span while  $\frac{d}{l}$  decreases with length of span. To determine the depth that gives



Side and End Elevations of Gehr Car Mover.

greatest stiffness, an algebraic expression for the stored energy in the truss due to the deformation of its members was formed and this equated to the deflection due to the given loads. Then the values of  $\frac{d}{p}$  that render this expression a minimum were deduced for different values of  $n$ , as follows:

For $n$	= 4	8	12	20	30
$\frac{d}{p}$	= 1.29	1.63	1.92	2.38	2.85
$\frac{d}{l}$	= 0.32	0.20	0.16	0.12	0.09

which give laws similar to those of the economic depth, and which show that the depth which gives the greatest stiffness is slightly less than the economic depth. It hence appears that no additional stiffness can be imparted to a bridge by giving to the truss a depth greater than the economic depth.

\*Reprinted from *Proceedings American Philosophical Society*, Vol. XLIV., 1905.

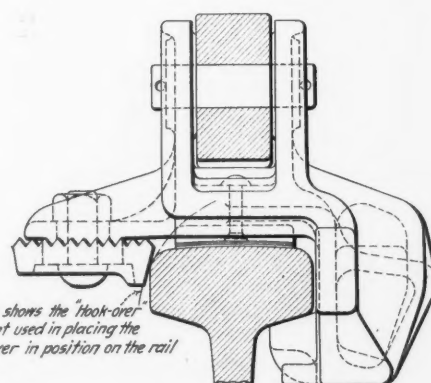
#### A New Car Mover.

Car movers are apt quickly to become useless, as they depend solely upon direct pressure on a sharp piece of steel which soon becomes worn and dull. The device shown in the accompanying detailed illustrations, made by Harvey J. Gehr, Waynesboro, Pa., has a clamp or locking action on the rail head. This action is not affected by wear and is always greater than the backward pressure on the bar, thus making it impossible for it to slip. The pinch bar is of steel and is attached to the fulcrum by a steel pin. The fulcrum is of malleable iron with steel bearing plate inserted at the point where it rests on the top of the rail, and an adjustable side piece



A New Car Mover.

is bolted to the lug on the left side to hold the fulcrum in position on the rail. When the side piece is once set for a given weight of rail no further adjustment is required. The fulcrum is shaped so as to clear the car wheel flange on either side of the track. The weight of one end of the lever being always supported by the pin prevents the fulcrum from tilting while sliding forward, by keeping the under lug in contact with the rail head. These tools are adapted for any size of rail from 40 lbs. to 100 lbs., and weigh 28 lbs. each. A number of them have been in use for over a year and have given satisfaction. Last winter they underwent a severe test on icy rails, on which they showed no tendency to slip. When fish plates are



This line shows the 'hook-over' movement used in placing the car mover in position on the rail

encountered by this type of mover, it has to be moved from one side of the track to the other, but this can be done easily and quickly.

#### Progress of the Electric Railway in Germany.

A recent number of the *Elektrotechnische Zeitschrift* contains some interesting statistics on the electric railway in Germany. The report is divided into three parts. The first part relates to those electric railways which were in operation on Oct. 1, 1904; the second, the electric railways in course of construction; third, trackless trolley systems, of which there are six in Germany. The following table shows the state of electric traction in the years 1896, 1900, 1903 and 1904:

	1896.	1900.	1903.	1904.
No. main centers electric railway systems	42	99	134	140
Length of roads in miles	336	1,806	2,325	2,388
Length of single track in miles	538	2,680	3,465	3,572
No. of motor cars	1,571	5,994	8,702	9,034
No. of trailers	989	3,962	6,190	6,477







# GENERAL NEWS SECTION

## NOTES.

During the month of July the westbound "Pennsylvania Special" 18-hour train between New York and Chicago arrived in Chicago on time every day; the eastbound arrived in Jersey City on time 23 days.

The Hon. H. R. Emmerson, Canadian Minister of Railways, says that the operating department of the Intercolonial is to be reorganized on the "divisional plan." The office of General Superintendent will be abolished and additional power given to the Division Superintendents.

It is announced by the Pennsylvania Railroad that it will no longer maintain a ticket agency with Thomas Cook & Son, New York City. Officers of the Pennsylvania believe that the only way to maintain rates is to sell tickets exclusively through the company's own offices.

It is announced that the New York Central will abolish the practice of lettering passenger cars with the names of the trains in which they are run, such as the Empire State Express and the Twentieth Century Limited, thus making all cars conveniently available for any train, so far as lettering is concerned.

A clerk, discharged last week from the general office of the Atchison, Topeka & Santa Fe at Chicago, is said to have secured and sold many thousands of dollars' worth of free transportation by the unauthorized use of blank passes on the Atchison and official requests, signed by President Ripley, for transportation on other roads.

The Railroad Commissioners of Texas, after a hearing, have decided that railroad companies are responsible for the icing in refrigerator cars; and also have ordered a reduction in icing charges to the basis of \$40 a car for 400 miles and \$20 for 100 miles, which is the minimum.

The Great Central (C. H. & D-Pere Marquette) route opened a new city office in Toledo, Ohio, August 24, which was made the occasion of a reception from 7 to 9 o'clock in the evening. Engraved invitations for the event were sent out, and there were music and flowers. The new office is at 416 Madison street.

President Ripley, of the Atchison, Topeka & Santa Fe, replying to critics, says that his company has derived no benefit from the advent of the Standard Oil Company in the Kansas field. The changes in rates for carrying oil were not made for the benefit of the Standard Oil Company. The road has never had any oil traffic in Kansas of any consequence.

The Secretary of the Navy in asking for bids for the transportation of naval supplies across the continent, has given the Canadian Pacific a chance. The Great Northern complained at the abrogation of an order issued by former Secretary Morton to confine the business to lines within the United States, but Secretary Bonaparte holds that under the law he must send goods by the cheapest route, regardless of ownership.

On the Oregon Short Line an order has been issued forbidding conductors to entrust student brakemen with the responsibilities of a brakeman's work. New men must ride over the road as students until they have had sufficient training. Another order requires telegraph operators to deliver to trains three copies of each train order; the third copy to be given to the brakeman at the head of the train, and by him, after reading, to the rear brakeman.

The Interstate Commerce Commission, by Chairman Knapp, has rendered a decision in the case of the Globe-Wernicke Co. against the Baltimore & Ohio Southwestern and others, in which it is held that while there is much to support the view that sectional bookcases might properly be placed in the first class of the Official Classification, it does not appear that "1½ 1st" for all bookcases is an unlawful discrimination against the sectional variety, and the action of defendants in fixing the same classification and rates for sectional as for other bookcases does not exceed the limits of their discretion; nor is defendants' 1½ times first-class rate for the transportation of sectional and other bookcases shown to be unreasonable. The complaint was dismissed without prejudice to further investigation.

A report from Montreal says that President Shaughnessy, of the Canadian Pacific has protested to the Dominion Government against the location of the Grand Trunk Pacific along the line now contemplated, which he declares is nowhere more than 10 miles from the Canadian Pacific main line or some of its branches. He says that it should be laid 30 miles away. In reply, Vice-President Morse, of the

Grand Trunk Pacific, has issued a statement in which he says that it is impossible to avoid locating the new line near the Canadian Pacific. He asserts that the Canadian Pacific is estopped from objecting to the nearness of the two roads in the western territory, by the fact that in the province of Ontario the Canadian Pacific and the Canadian Northern are both paralleling Grand Trunk lines so near as to be within sight of them.

After discussing the question for several years the Railroad Commission of Texas has at last unanimously agreed that under the Constitution of that State the Houston & Texas Central, and the other north and south roads controlled by the Southern Pacific, in that state, are unlawfully combined; and the Commission has notified the Attorney General to proceed against the H. & T. C., in the District Court at Austin, for forfeiture of its charter. The Commission made similar charges against the Texas & New Orleans and the Houston, East and West Texas roads some months ago, but final action was deferred pending the outcome of negotiations that were said to be going on for the sale of the Texas & New Orleans to a separate corporation. This sale was authorized by a special act of the last Legislature, but it has never been carried out.

## Grain Rates.

The Trunk lines have announced increases in the rates on grain from Buffalo to New York, and other Atlantic ports, varying from one cent a bushel on rye to ¼ cent on oats. The new rates in cents per bushel are shown in the first column of the table below:

	New rate.	Old rate.
Wheat .....	4½ cts.	4½ cts.
Corn .....	3½ "	3 "
Oats .....	3¼ "	3 "
Rye .....	4½ "	3½ "
Barley .....	3½ "	3½ "

The Chicago eastbound lines have decided to make advances of 2 and 2½ cents per 100 lbs. on grain and grain products; effective September 1, except that on grain products for export the advance will not be made until September 20. The new domestic grain rates will be on a basis of 17½ cents per 100 lbs. from Chicago to New York, and on export shipments, 15 cents. The Eastern and Gulf lines have not yet come to an agreement. Following the severe reductions of last spring, there was an agreement on the following rates, which are now in force:

Omaha to Gulf ports .....	18.0
Kansas City to Gulf ports .....	17
Omaha and Kansas City to Baltimore .....	22.5
Omaha and Kansas City to New York .....	23.5

The Gulf lines hold out for a differential of 6 cents below the Eastern lines. The Western railroads, at a meeting at which all except the Missouri, Kansas & Texas and the Kansas City Southern were represented, have adopted a resolution to the effect that "1¼ cents per 100 lbs. be once allowed for unloading all grain originating at or west of the Missouri River, when the grain is unloaded at any point, and will be paid but once either by the direct lines or the connecting lines. . . ." It is said that this will be followed by the announcement of an agreement settling the differences between the Gulf lines and those to the East.

## Another Verdict on the Mentor Wreck.

Coroner York, of Lake County, Ohio, has rendered his verdict on the derailment at Mentor, June 21, when 19 persons were killed. He says that the testimony is insufficient to hold anyone guilty of criminal negligence; but that it tends to show that the misplaced switch was opened by an employee of the railroad company.

## Japanese Cars—A Correction.

In the article describing the covered goods wagons built by the Western Steel Car & Foundry Company for the Japanese Railways in our issue of August 18, an erroneous impression was conveyed by the statement that this was part of an order for 2,400 of these cars placed in this country, the remainder being built by other works. As a matter of fact, the Western Steel Car & Foundry Company prepared its own designs for the lot of cars which they built and which the article described, being entirely independent of any other company in the matter.

## Union Pacific Gasolene Motor Cars.

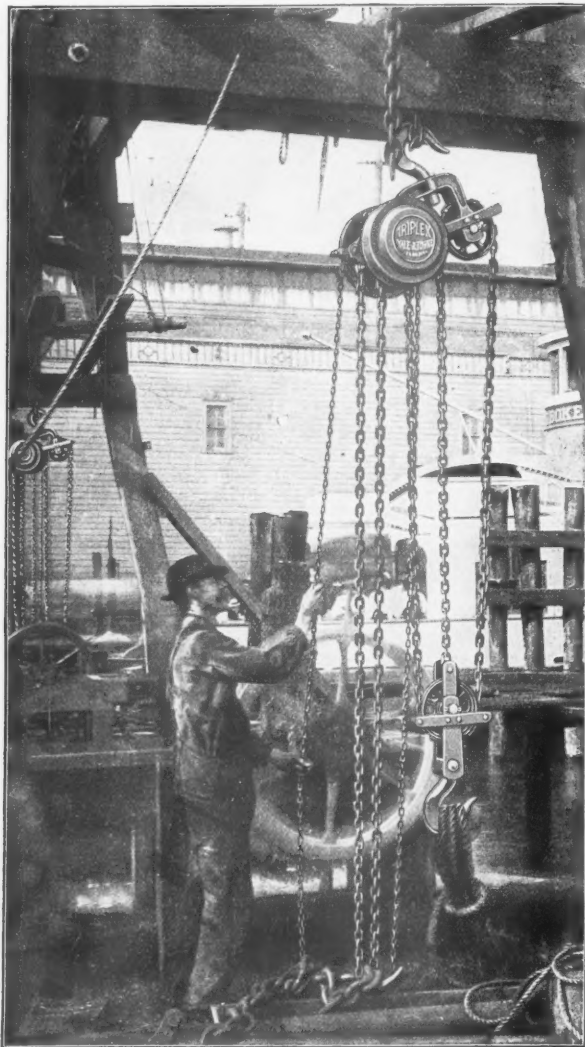
Union Pacific motor car No. 1, which for a time was in service out of Portland, Ore., is now running between Kearney and Callaway, Neb., 66 miles, at an average rate, including stops, of 20 m.p.h. There is one steam train and one motor car a day each way on this branch. Motor car No. 2 is about ready for the road at the Omaha shops. It is much larger than No. 1, being 55 ft. long, and has seating capacity for 56 persons. It has double trucks and is of steel construction practically throughout.

#### Disastrous Street Car Collision at Butte.

At Butte, Mont., on the night of August 20 an electric street car, returning from a summer resort, was struck by a freight train of the Butte, Anaconda & Pacific at a crossing; and nine passengers, seven of them girls, were killed. One other was fatally injured and 13 less seriously hurt. The freight train consisted of 14 cars and was being pushed eastward. The conductor was on top of the leading car with a lantern, and it is said he warned the motorman of the street car.

#### Triplex-Blocks as Emergency Hoists.

The accompanying illustration shows two five-ton Yale & Towne triplex chain blocks raising a bridge at the D. L. & W. ferry slips in Hoboken. Four of these blocks were secured promptly after the recent fire and were attached to supports and used for the purpose indicated. Chain blocks are sometimes used as permanent hoisting apparatus in ferry slips, but these blocks were used only as emergency hoists and were replaced as soon as permanent sup-



The Yale & Towne Triplex Block in Use as an Emergency Hoist.

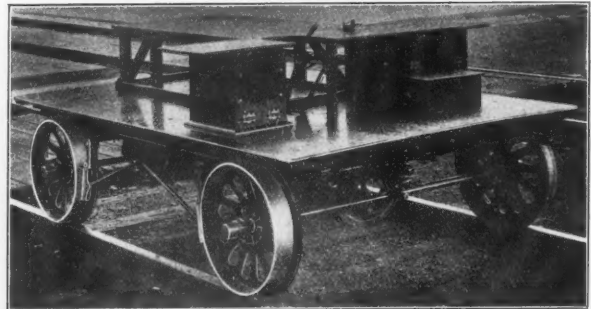
ports could be built and the regular hoisting apparatus installed. The principal features of these triplex blocks are the convenience with which they can be handled, their ease of operation and their high efficiency. The triplex block is probably the most convenient hoist for emergency work, in addition to its regular application to lifting jobs in shops, freight houses, roundhouses, and on docks.

#### Japan's Electric Tramways.

The first electric tramway built in Japan was the line, eight miles in length, which was opened in Kyoto in 1895. Since then, other cities of importance have built electric tramways, and there are now 17 companies with an aggregate capital of 36,000,000 yen (\$18,000,000), whose lines already opened aggregate 120 miles, with 85 miles more building. Most of these companies have not yet a very profitable business; but that the profits will be large is indicated by the fact that the electric tramways of Tokio already pay annual dividends of not less than 10 per cent.

#### New Gasolene Motor Gang Car for Railroads.

A new type of Oldsmobile gasolene motor car for railroad use was exhibited in Chicago last week, and an illustration of it is shown herewith. It is intended for the transportation of section gangs, bridge gangs, yard switching crews, etc. It will carry a gang of ten men as well as tools and materials. The makers claim a number of features of novelty and special merit in the design. The car is propelled by a two-cylinder, 8-h.p. gasolene engine mounted on a



Oldsmobile Gang Car.

rigid frame made of steel tubing to give maximum strength with minimum weight and durability. The transmission is arranged to give the same speed forward and backward, enabling the car to be run with equal facility in either direction without being turned. The engine is air-cooled—another new feature in this service.

The car is equipped with a double hub brake, enabling quick control and stopping of the car at all times. The engine and propelling machinery are so designed that they can be built for gages from 24 in. upward. The designers have endeavored to produce a car easily and simply handled so that an unskilled person can run it safely and successfully.

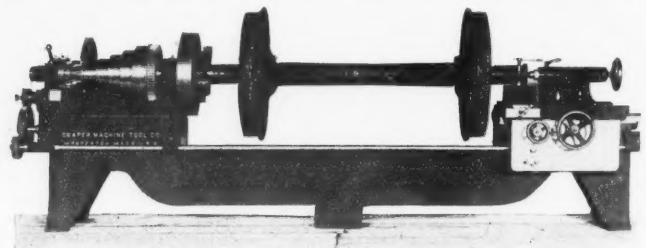
The Olds Motor Works, Detroit, Mich., are the builders and the Railway Appliances Co., Chicago, is the selling agent.

#### Progress at Panama.

Theodore P. Shonts, Chairman of the Isthmian Canal Commission, arrived in this country recently from Panama, and is quoted as follows on the situation: "I have laid off all steam shovels until the railroad tracks have been put into proper condition for their use. I found when I was on the Isthmus at least six steam shovels out of which the operators were not getting to exceed 25 per cent. of efficiency. That condition could not be allowed to go on, so we have ordered all steam shovel work discontinued for the present. We shall have no difficulty in getting all the labor we may want. The superintendent who has charge of that branch of the work has worked 75,000 men on a single contract, and he says he could get 100,000 blacks for work on the canal if so many were needed. The principal idea at present is to provide quarters for the employees, to establish good sanitary conditions and to arrange for the prompt payment of the men. Once these preliminaries are arranged we will begin to make the dirt fly."

#### A New Gap Lathe.

The accompanying illustration shows a 23-in. gap lathe made by the Draper Machine Tool Co., Worcester, Mass. It is especially adapted for steam and street railroads for truing car axles when the car wheels are in place, thus saving the time of forcing the



A New Gap-Lathe.

wheels off, truing the axles and then forcing the wheels on again as is usually done when truing car axles. This tool swings 22 in. over the ways, and a standard car axle with wheels in place over the gap. It has a 13-ft. bed, which takes 7 ft. 8 in. between centers, and is furnished with a rod feed and plain block rest as shown. It can also be made with a block to fill the gap and can be fitted with a compound rest, lead screw and gears for screw-cutting, so that it can be used as a regular engine lathe when not being used for truing car axles.

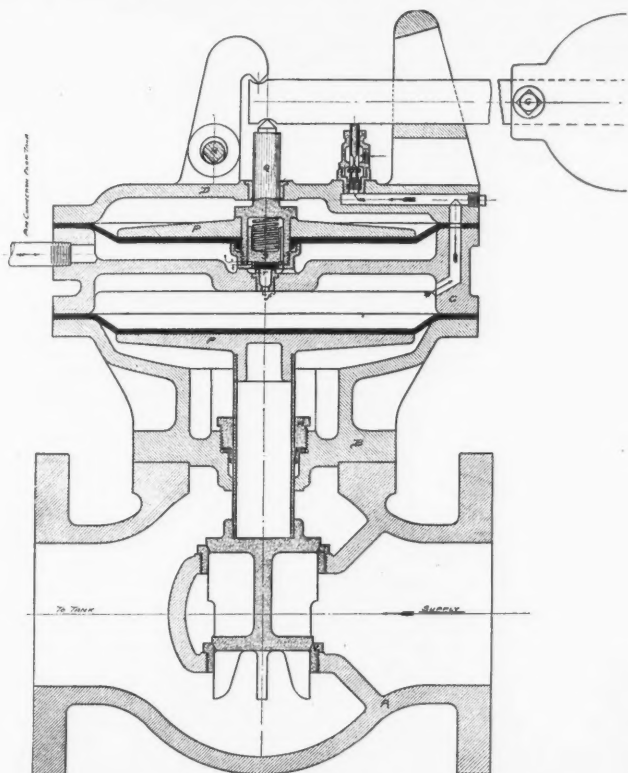


**Ashtabula-Port Burwell Car Ferry.**

J. W. Ellsworth & Co., coal dealers, have given a contract to the Great Lakes Engineering Works, of Detroit, Mich., for a twin-screw steel car ferry to operate between Ashtabula, Ohio, and Port Burwell, Ontario, in connection with the Pennsylvania Lines in Ohio and the Canadian Pacific in Ontario. The vessel will have four tracks, with a capacity for thirty fifty-ton cars, and will be equipped with engines capable of twelve miles an hour. It will be 350 feet over all, 56 feet beam and 20 feet deep from deck to keel, and will be of the enclosed type, with accommodations for passengers and crew on the upper deck. It will be equipped with triple-expansion engines and Scotch boilers.

**The Anderson Altitude Valve.**

Some difficulty has always been experienced by railroads with water-regulating valves failing to properly maintain a uniform stage of water in locomotive supply tanks. This is especially true in the northern states, where extreme cold weather forms ice in the tanks and interferes with the regularity of operation of the prevailing form of float valve inside of the tank. The float commonly used may be put out of service either through becoming water-logged and losing its buoyancy or through becoming lodged in or on ice formed on the surface of the water. If the float becomes water-logged the supply does not cut off and the tank overflows, while on the other hand if it lodges in the ice the supply is cut off and the tank is



Section Through Anderson Patent Altitude Valve.

soon emptied. In either case the tank is put out of commission until the water service repair men can be called to repair the valve. Another objection to this form of valve is the fact that the tank must be drained dry in order to make repairs on the float.

The Golden-Anderson Valve Specialty Company, Pittsburg, Pa., has recently brought out a novel valve known as the Anderson patent altitude valve which does away entirely with the use of a float and its attendant troubles. The valve is placed in the pit under the tank below the frost line, where it cannot become inoperative through freezing up and by placing a gate valve between the altitude valve and the tank, the tank can be kept full of water should it be necessary to make any repairs. The accompanying drawing shows a cross-section through the valve. Its operation is as follows: Normally the main valve in the bottom chamber is closed. When the pump is started the pressure forces this valve off of its seat—the valve being unbalanced—and water is allowed to pass through it to the tank. When the water in the tank reaches the required height it overflows through a small pipe leading down to the upper part of the valve. The pressure from this overflow raises the upper diaphragm and the auxiliary stem Q, which in turn raises the weighted lever off of the release valve in the top of the main valve cover. Continued upward movement of the top diaphragm raises the auxiliary valve leading to the lower dia-

phragm off of its seat and allows the tank pressure to act on the lower diaphragm. This is connected to the main valve and when the pressure comes on the diaphragm the main valve closes and cuts off the water supply. The small release valve in the top allows the pressure on the lower diaphragm to bleed off so long as the weighted lever is down and water is passing through the main valve. For gasoline engine pumping plants an auxiliary valve attachment is furnished for controlling the supply of gasoline to the engine so that the engine will run slow when the main valve is closed and no pumping is required. When the main valve opens, the supply of gasoline is automatically increased until the desired pumping speed is reached.

**Drawbridge Disaster Near Norfolk.**

On Thursday, August 17, an excursion train carrying 169 passengers, all negroes, ran into an open draw at the Elizabeth river, five miles from Norfolk, Va., on the Norfolk division of the Atlantic Coast Line, and the engine and first car fell into the stream. The car fell against the center pier and lodged with its body nearly in a vertical position, so that most of the passengers in it were drowned, a few crawling out through a hole which was broken in the roof near the end which was uppermost. Thirteen passengers were killed and about 60 injured. The engineman was seriously injured. It appears that there is no derailing switch at the draw and that, according to rule, the train should have come to a full stop before crossing. This stop was not made. It is said that Engineman Reigs had never before run over this line. It is also said that at Bruce's station, a mile west of the drawbridge, he had received an all-clear block signal for the block section in which the drawbridge is situated. An officer of the road is reported as saying that this block signal had nothing to do with the drawbridge; in other words, that while it gives the right to the road throughout the block section, this right is subject to the liability of being stopped at the draw by a signal from the draw tender.

**Concrete-Steel Ties in a Derailment.**

H. E. Percival, inventor of the Percival concrete-steel tie, now being tried on the Galveston, Houston & Henderson, and illustrated in the *Railroad Gazette* July 28, writes that two or three cars were derailed on this experimental section of track recently, and that one truck ran over all 25 of the ties, but did not fracture or injure any of them in the least.

**The First Trans-Atlantic Tow.**

The steamship Captain E. L. Drake, with Standard Oil barge No. 95 in tow, arrived at Sabine, Texas, August 18, on her return trip from London. This is the first round-trip voyage of this character which has ever been made, although the Standard Oil steamer Atlas last year towed a barge from New York to San Francisco. The time required for the steamer and barge to make the run from London to Texas in ballast was 21½ days, and during the first two weeks strong winds and a rough sea were encountered.

**The Missouri Maximum Freight Rate Bill.**

Of all the measures passed by the last legislature the maximum freight rate bill was the most injudicious and discreditable. There was no call from business interests for such a bill. A single coal operator, who was almost constantly having suits with railroad companies, prepared this bill to create more trouble. It was placed in the hands of an able, experienced and excellent member of the house. He admitted that he did not know whether rates in the bill were right or wrong, yet he quietly but earnestly worked on the country membership and succeeded in passing the measure. The vast majority of the shippers of freight were perfectly satisfied with rates, and none came to the legislative committees to make complaint. Among the people of the state there was general satisfaction. But the enemy of railroads and railroad managers was constantly at the state capital. One of his statements was that the "railroad commissioners would see that the rates were fair." Again he assured the indifferent and uninterested members that "Governor Folk would veto the bill if he thought the bill was not good." The governor admitted that he knew nothing of railroad rates, and he only approved it because it was passed by a large majority in the House and Senate. He should have vetoed the bill, but as many officials do, he pandered to the anti-railroad men. The railroad commissioners seemed to be unusually eager to fix all maximum freight rates. They have been checked. By the ablest railroad experts and lawyers the law is considered unreasonable and unjust. It has been carried to the courts for decision.—*St. Joseph Gazette*.

**Civilization as Affected by Railroads.**

The war between the Pennsylvania and the Muncie & Portland Traction Company, which culminated last night in the fatal wounding of two men and the slight wounding of several others, continued to-day [Aug. 26], but the railroad company is holding the crossing, and so far has the advantage of the situation. Each of the rival companies has a large force of men on the ground, and the Sheriff of the county has sworn in 50 deputies in the hope of preserving the peace. The injunction got out by the railroad com-

pany is still in operation, but the citizens and the country people are in sympathy with the traction company and are anxious to make the crossing, regardless of the court's action. It is this threatening condition that causes the local officers to be constantly on the lookout for trouble.

After the shooting last night, in which Detective Purdy and William McCarty were fatally wounded, there were many riots and much stonethrowing by citizens, and several of the railroad construction gang were struck and severely bruised. Two farmers who were watching the trouble but taking no part in it, were wounded. Sheriff Barr has made no arrests and says that it is impossible to learn who did the shooting, except in the case of the wounding of Detective Purdy. Marshal May fired the shot that struck Purdy, but the Sheriff says it was justifiable, and he has not been arrested.

—Press despatch from Red Key, Ind.

#### Evening Courses in Railroad Education.

The University College of the University of Chicago has issued a special announcement concerning its evening courses in railroad education for the ensuing year. The establishment of these courses and an outline thereof was given in the *Railroad Gazette* Nov. 18, 1904. The 1905-06 courses will begin October 3. An Advisory Board composed of leading railroad executive officers of Chicago and University officials has been organized. E. W. McKenna, Assistant to the President of the C., M. & St. P., is Chairman, and Daniel Willard, Second Vice-President of the Burlington, Vice-Chairman. It is the hope that ultimately there will be established a school of railroad education catering for every branch of service where special preparation is desirable. It is further hoped that in due time a large railroad museum, a complete railroad library and a well-equipped locomotive testing plant will form integral parts of this department of the University.

#### Canton-Hankow Concession.

At a meeting of the stockholders of the American-China Development Co., held in Jersey City on August 29, it was voted to sell to the Chinese Government the concession for a railroad from Canton north to Hankow, the Government paying the company \$6,750,000. This concession was granted in 1898. Thirty miles of road have been laid and the whole line (800 miles) surveyed. According to the terms of the concession, the Chinese Government had the right to cancel the contract at the end of a period of 25 years; but since 1902, when the company began building, there has been a good deal of interference from the Government and the stockholders have evidently decided that the completion of the road will be impracticable. Mr. J. P. Morgan, whose banking firm held the controlling interest in the company, therefore decided to accept the offer of the Chinese Government to pay an indemnity and cancel the contract. Foreign interests in the Development Company, represented by the King of Belgium, have opposed this relinquishment, but unsuccessfully.

#### Ton-Mile Statistics in England.

At the meeting of the shareholders of the London & North-Western, August 18, the remarks of the Chairman, Lord Stalbridge, on the stormy subject of ton mileage returns were so moderate, as compared with his views expressed last year and on previous occasions, that the *Statist* (London) believes a change is slowly but surely working in this most conservative of English companies in favor of statistics according to the American method. Last week Sir Edward Grey, Chairman of the North-Eastern, the only road in Great Britain to adopt ton-mile statistics, said that about ton-mile statistics there was nothing of spiritualism or black magic, or anything uncanny of that kind, although the very mention of them seemed to excite hearty feelings and passion in the railroad world. He said that the figures were a simple, cheap and comprehensive method of telling the shareholders how much work the company had done. "You know, for instance, the weight of the stuff you have carried in the half-year. That does not tell you the amount of work you have done until you know how far you have carried that stuff. You want weight and distance combined to know the amount of work the railroad has done, and the ton-mile gives you that. It tells you the amount of work you have done, but standing by itself it does not tell you anything else. You want to go further—you want to know whether you have done that work well or ill, whether you have done it better or worse than you did it a year ago, and so you bring in train-mile statistics, and you compare the ton-miles and the train-miles, and that gives you some idea of whether you are doing your work better or worse than you did it a year ago. You want still further figures, into which I will not enter now, to complete your knowledge of whether you are doing your work well or ill. You want to know the time you have taken about it, and so forth. But my only object in introducing the subject of the ton-mile statistics is to explain that they are really a very simple question, and that the reason why we use ton-mile statistics is simply because we wish to know the amount of work we have done, not merely the weight of goods we have carried, but how far we have carried them, in order that we may then be able, by the use of the train-mile figures, to find out, not only the amount of work we are doing, but

whether in each half-year we are doing that work better or worse than we did it the year before."

The *Statist* has from the first been an earnest advocate of ton-mile statistics, and is confident that they will come in time on the other British railroads as they have on the North-Eastern.

#### Westinghouse Train Tests at West Seneca, N. Y.

On August 23, the Westinghouse Air Brake Co. conducted at West Seneca, N. Y., on the tracks of the Lake Shore & Michigan Southern a series of tests with two trains of 50 cars each, equipped with Westinghouse friction draft gear, improved triple valves, automatic air couplers and automatic slack adjusters. The tests were similar to those made for the benefit of the visiting delegates to the International Railway Congress last May near Pittsburg. About 125 prominent railroad officers, representing nearly every important railroad east of the Mississippi river, were present, and witnessed the demonstration. The cars used were steel underframe gondolas 40 ft. long of 100,000 lbs. capacity, and the locomotives were of the Lake Shore heavy consolidation type. The stopping tests, with the improved triple valve, showed that it was possible to stop a train in 40 per cent. less distance than with the old type of triple valve. With the valve the brakes are released at the end of the train first instead of on the cars next to the engine. This will prevent break-ins to some extent. All of the tests were successful in showing the value of the devices with which the trains were equipped.

#### To Extend Foreign Trade.

The Department of Commerce and Labor is desirous of securing the co-operation of manufacturers and other persons interested in the efforts which are being made by the department, through the Bureau of Manufactures, to extend the foreign trade of the United States. In furtherance of this work it is proposed to establish a comprehensive card index, which will enable information to be furnished to manufacturers or intending purchasers. It is contemplated to extend the system to the principal United States consulates, if the necessary authority is granted by Congress. To enable the bureau to prepare such an index, blanks are being sent to manufacturing companies interested in export business asking certain statistical questions.

#### The Gordon Battery.

The Gordon Battery Company, 439 East 144th street, New York City, announces that henceforth the Gordon battery will have the copper element already packed in the perforated cylinder, so that there will be no trouble to fill the cylinder; and a new cylinder containing copper element is furnished with every recharge, so that no cleaning of cylinders or copper supporting frames is necessary. The necessity of handling any of the parts that are immersed in the solution is entirely obviated when renewing. It is only necessary to unscrew the brass connector on top, drop out and discard the old cylinder and zinc and empty out the old solution. New zincs and cylinder containing copper element are then affixed to the cover as in setting up new cells. The improved battery and recharge has been in experimental use during the past six months.

#### Manufacturing and Business.

Bids are wanted September 7 by George E. Best, Commissioner of Bridges of New York City, for furnishing and delivering track material for the Williamsburgh bridge over the East river.

Mr. James C. Hain, formerly Engineer of Masonry Construction of the Chicago, Milwaukee & St. Paul, is now in charge of masonry construction with J. G. White & Co., Engineers and Contractors, of New York.

The Allan F. McIntyre Co., Monadnock Block, Chicago, dealers in iron, steel, boilers, etc., has been appointed Chicago agent for the Falls Hollow Staybolt Co., makers of refined charcoal, bloom staybolts, both hollow and solid.

The Pressed Steel Car Company announce that Peter M. Kling, recently Superintendent of the John Stephenson Company, of Elizabeth, N. J., has been appointed Manager of its Passenger Car Department, with headquarters at McKees Rocks, Pa., effective September 1st.

The Lancaster Automatic Railway Crossing Co., of Petersburg, has been incorporated in Virginia with a capital of \$100,000 to make railroad crossings and other safety appliances. The officers of the company are: G. W. Lancaster, President, and Morris A. Finn, Secretary and Treasurer, both of Petersburg.

According to a reported interview with an officer of the Baldwin Locomotive Works, this company expects this year to break its 1903 record, when it turned out 2,047 locomotives. During the first six months of the present year, 1,000 locomotives were built, and it is expected that the production for the entire year will be 2,100.

Frazier, Fox & Spencer, Consulting Engineers, Cleveland, Ohio, have opened offices in the Rockefeller Building. Messrs. Frazier and Fox have been connected with the designing and contracting department of the Brown Hoisting Machinery Co. for about six



years, and Mr. Spencer for several years was connected with the same department of the American Bridge Co.

Mr. Harry B. Jewkes announces that he has severed his connection with Hyde Bros. & Co., of Pittsburg, where he has had an interest and been Manager of the rail department for the past four years, and has organized the Iron City Steel Co., with offices in the Bessemer Building, Pittsburg. The new company will deal in new and relaying rails and other iron and steel products. Mr. Jewkes is President and Treasurer, and I. W. Jenks, Vice-President and Secretary.

The J. G. Brill Company, Philadelphia, has just received an order from the United Railroads of San Francisco for 200 of its patented No. 27-G-E-1 type of double-truck. This is a short-base double-truck having the Brill system of equalization which in this type consists of semi-elliptic equalizers which carry a truss form of bolster at either end suspended from the side frames by spring links at points some distance apart near the yokes. Each side frame is solid forged and the angle iron transoms are secured to the side frames with forged double and single-corner brackets. The brakes are usually inside hung.

The annual meeting of the stockholders of the National Battery Company, which now ranks second in this country in the electric storage battery business, was held August 4, at the general offices of the company in Buffalo. The old Board of Directors were continued unchanged, and the following officers of the company were elected: John R. H. Richmond, formerly Treasurer, was elected President; James Macnaughton, formerly Vice-President, was continued in the same office; Ralph Kimberly, formerly Secretary, was appointed to fill the offices of both Secretary and Treasurer, the latter office being the one formerly occupied by Mr. Richmond; R. L. Coleman, formerly President of the company, was elected Chairman of the Board of Directors, and James Macnaughton, under whose management the company has been brought to its present position of strength and activity, was reappointed General Manager.

#### Iron and Steel.

The Pennsylvania, it is reported, is in the market for 140,000 tons of structural steel and rails, and it is probable that the order will be increased to 200,000 tons. The rails will be used principally on the Lines West of Pittsburg.

Orders have been given by the Atchison, Topeka & Santa Fe for 1,000 tons of bridge material, and by the Missouri Pacific for 500 tons of fabricated steel to the American Bridge Co. Only small orders for rails have been placed lately, but negotiations are still pending for considerable quantities.

#### MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

##### American Academy of Ophthalmology and Otolaryngology.

At the meeting of this society, to be held at Lenox Hotel, Buffalo, September 15, there will be read a paper on "Advantages and Disadvantages of Glasses in Railway Service: With Appended Report of the Opinion of the Ophthalmologists throughout the United States as to the Safeness of an Employee Requiring Their Use." It is scheduled to be read Friday morning at 9.45. The Academy will be pleased to have railroad officers interested in this question attend the meeting and take part in the discussion of the paper. Inquiries should be addressed to Dr. Geo. A. Suker, Secretary, Columbus Memorial Building, Chicago, Ill.

##### Roadmasters' Association.

The Roadmasters' and Maintenance of Way Association will hold its twenty-third annual convention at Niagara Falls, N. Y., Sept. 12, 13 and 14. Rates have been made for delegates and others by both the International and Cataract Hotels, which are under the same management. C. E. Jones, Beardstown, Ill., is Secretary of the Association. Room for the exhibition of track material and devices in which roadmasters will be interested has been arranged for in the hotel and on the piazza and lawn at the rear of the hotel. Intending exhibitors to secure space should at once notify John N. Reynolds, Secretary and Treasurer of the Road and Track Supply Association, 1660 Monadnock Building, Chicago, Ill.

#### PERSONAL.

—Mr. James E. Price, General Superintendent of the Intercolonial Railway, died recently at his home in Moncton, N. B., at the age of 51.

—Mr. John B. Berry, Chief Engineer of the Union Pacific, has been appointed a member of the Board of Consulting Engineers of

the Panama Canal. Mr. Berry fills the vacancy made by the resignation of Herman Schussler.

—Mr. C. G. Delo, Engineer of Maintenance of Way of the Chicago & Alton at Kansas City, began his railroad career with the Atchison, Topeka & Santa Fe in 1887, when the line from Chicago to Kansas City was being built, and he remained with that company about a year. In 1890, he was on the Burlington, Cedar Rapids & Northern, where he remained until 1902, during which time he was successively Assistant Engineer, Chief Draftsman and Division Engineer. When this road was absorbed by the Chicago, Rock Island & Pacific, Mr. Delo was made Principal Assistant Engineer of the Eastern district of that road. In March, 1904, he became Division Engineer of the Chicago Great Western, where he remained until he took his present position on the Alton.

#### ELECTIONS AND APPOINTMENTS.

*Canada Atlantic.*—See Morelia & Tacambaro.

*Canadian Pacific.*—C. W. Spencer, General Superintendent of Transportation of Eastern lines, has resigned, effective Aug. 31.

The office of Engineer of the Central division has been abolished and hereafter the work will be in charge of the Assistant Chief Engineer.

W. A. James has been appointed Engineer in charge of the grade revision and double tracking from Fort William to Winnipeg.

J. H. Eaton has been appointed Assistant Master Car Builder of western lines, with headquarters at Winnipeg.

Frank Lee, Assistant Engineer of the Western division, has been appointed Engineer of the Central division, with headquarters at Winnipeg, Man., succeeding J. E. Schwitzer, transferred.

Hugh Craig has been appointed General Car Inspector of the Western lines, with headquarters at Winnipeg, Man.

*Chicago, Burlington & Quincy.*—William Fitzgerald, Jr., General Agent at Hannibal, Mo., has been appointed Assistant General Freight Agent, with headquarters at St. Joseph, Mo., succeeding W. C. Maxwell, resigned.

*Chicago, Rock Island & Pacific.*—W. L. Hope, Division Engineer at Chicago, has been appointed Train Master of the Dakota division, with headquarters at Estherville, Iowa, succeeding A. B. Copley, promoted.

*Chicago Southern.*—See Southern Indiana.

*Erie.*—George H. Burgess, Assistant Engineer of the Northwest system of the Pennsylvania Lines West, has been appointed Assistant Engineer of the Erie. Mr. Burgess will have charge of the terminal improvements in Jersey City, N. J.

*Green Bay, Oshkosh, Madison & Southeastern.*—C. H. Hartley, Superintendent of the Ashland division of the Chicago & North-Western, has been appointed General Manager of this new road.

*Lehigh Valley.*—G. P. Troutman, Assistant Division Engineer, with office at Centralia, Pa., has resigned, effective September 15.

*Missouri, Oklahoma & Gulf.*—F. C. Faust, Chief Engineer, has resigned. H. S. Moore has been appointed Chief Engineer, with office at Muskogee, Ind. T., succeeding Mr. Faust.

*Morelia & Tacambaro.*—E. J. Chamberlin, hitherto General Manager of the Canada Atlantic, has been elected President of this Mexican road.

*Oregon Railroad & Navigation.*—See Southern Pacific.

*Panama Canal.*—W. C. Bied, hitherto Superintendent of Terminals of the Chicago, Rock Island & Pacific in Chicago, has been appointed Assistant Construction Engineer of the Panama Canal.

Carl A. Strom, Mechanical Engineer of the Isthmian Canal Commission, has been appointed Superintendent of Motive Power and Machinery of the Panama Canal.

*Pennsylvania Lines West.*—George H. Burgess, Assistant Engineer of the Northwest system, with office at Pittsburg, has resigned. He is succeeded by D. Y. Swaty, hitherto Assistant Engineer on the Southwest system. Mr. Swaty is succeeded by C. E. Rowe; office at Pittsburg.

*St. Louis & North Arkansas.*—C. E. Overstreet has been appointed Purchasing Agent, succeeding F. H. Leslie, deceased, with office at Eureka Springs, Ark.

*St. Louis, Watkins & Gulf.*—H. B. Kane has been elected Vice-President and General Manager, and W. F. Lee, Assistant Secretary; both with office at Lake Charles, La. A. G. Cochran has been appointed General Solicitor, with office at St. Louis, Mo.

*Seaboard Air Line.*—Frank K. Huger, General Superintendent, has resigned. Charles H. Hix, Division Superintendent at Richmond, Va., succeeds Mr. Huger, with office at Portsmouth, Va.

*Southern Indiana.*—M. W. Wells has been appointed General Man-



ager of this company and of the Chicago Southern, with office at Chicago, succeeding J. W. Thompson.

The office of Superintendent being temporarily vacant, the duties of this office will be performed by the General Manager.

**Southern Pacific.**—The freight and passenger departments of the Oregon lines of the Southern Pacific, and the Oregon Railroad & Navigation Co. have been consolidated, effective September 1. R. B. Miller, General Freight Agent of the O., R. R. & N., with office at Portland, Ore., has been appointed General Freight Agent for both companies. W. E. Coman, who has been General Freight and Passenger Agent of the Southern Pacific, has been appointed First Assistant General Freight Agent for the two roads; Paul Shoup, heretofore District Freight Agent of the Southern Pacific at San Jose, Cal., and W. D. Skinner have been appointed Assistant General Freight Agents, and A. L. Craig has been appointed General Passenger Agent; all with headquarters at Portland.

**Trans-Continental.**—D. MacPherson, formerly Engineer of the Eastern division of the Canada Atlantic, has been appointed Assistant Chief Engineer of the Trans-Continental, which is being built by the Government from Moncton, N. B., to Winnipeg, Man., where it will connect with the Grand Trunk Pacific.

**Wabash.**—J. S. Goodrich, Superintendent of the St. Louis division, with headquarters at Moberly, Mo., having resigned, the jurisdiction of Richard Doyle, Superintendent of the Western division, will be extended over the St. Louis division.

W. S. Newhall, Chief Engineer, has resigned, effective September 1. A. O. Cunningham, Bridge Engineer, will succeed Mr. Newhall, with headquarters at St. Louis, Mo., and the position of Bridge Engineer will be abolished.

#### LOCOMOTIVE BUILDING.

*The Iowa Central* is reported as being in the market for locomotives.

*The Minneapolis & St. Louis* is reported as being in the market for 10 locomotives.

*The Tennessee Central* is reported to be in the market for 15 freight locomotives.

*The Canadian Pacific*, it is reported, will place an order for 10 locomotives at its Angus shops.

*The Ishmian Canal Commission* is reported as being in the market for additional locomotives.

*The Toledo, St. Louis & Western* has ordered 15 simple consolidation (2-8-0) locomotives from the American Locomotive Works. These engines will be built at the Dunkirk Works and are for December delivery. They will weigh 189,000 lbs., with 166,000 lbs. on drivers; cylinders, 21 in. x 28 in.; diameter of drivers, 57 in.; wagon-top boiler, with a working steam pressure of 200 lbs. There will be 322 Detroit tubes, 14 ft. 6 in. long x 2 in. outside diameter; the firebox is of carbon steel, 109 in. x 63 in.; grate area, 47 sq. ft.; tank capacity, 7,000 gallons, and coal capacity, 15 tons. The special equipment includes: Midvale steel axles, Carey boiler lagging, Sterlingworth brake-beams, American Brake Shoe & Foundry Co.'s brake-shoes, Tower couplers, Dressel headlights, Simplex injectors, Ajax journal bearings, Jerome valve and piston rod packing, Consolidated safety valves, Leach sanding devices, Nathan sight-feed lubricators, Railway Steel Spring Co.'s springs, Ashton steam gages, Midvale driving, truck and tender wheels, and cast-steel wheel-centers.

*The Seaboard Air Line*, as reported in our issue of June 9, has ordered 10 ten-wheel (4-6-0) freight locomotives from the Richmond Works of the American Locomotive Co. These locomotives will weigh (engine and tender) 265,050 lbs., with 125,300 lbs. on the drivers; cylinders, 19 in. x 28 in.; diameter of drivers, 60 in.; wagon top boiler, with a working steam pressure of 200 lbs.; heating surface, 2,644.94 sq. ft.; 328 steel tubes, 2 in. in diameter and 14 ft. 1½ in. long; firebox, 9 ft. long and 3 ft. 5¼ in. wide; grate area, 31.50 sq. ft.; tank capacity, 5,000 gallons, and coal capacity, 11 to 12 tons. The special equipment includes: Westinghouse-American air-brakes, Seaboard Air Line bell ringers, couplers, headlights and springs, Monitor injectors, U. S. metallic piston rod packings, Garlock valve rod packings, Coale safety valves, Leach automatic sanding devices, Nathan triple sight-feed lubricators and Ashcroft or Star steam gages.

#### CAR BUILDING.

*The Pullman Company* has asked for prices on material for 2,000 cars.

*The Chicago, Burlington & Quincy* is in the market for five dining cars.

*The Mexican International* is reported as being in the market for 200 dump cars.

*The Chicago, Peoria & St. Louis* is reported to be in the market for 500 freight cars.

*The Central Railroad of New Jersey* is asking bids on 50 all-steel hopper ore cars.

*The Havana Central (Electric)* has ordered 30 cars from the Wason Manufacturing Co.

*The Southern* is reported as being in the market for 1,500 flat cars of 100,000 lbs. capacity.

*The Central of Georgia* has ordered 50 Hart convertible cars from the Rodger Ballast Car Co.

*The Erie*, it is rumored, is figuring on 2,000 steel underframe box cars and 1,000 steel flat cars.

*The St. Louis Syrup & Preserving Company*, Granite City, Ill., is in the market for 25 steel tank cars of 7,000 gallons capacity.

*The Nashville, Chattanooga & St. Louis* has just completed at its own shops 100 standard flat bottom coal cars of 80,000 lbs. capacity.

*The Muncie & Portland Traction Co.*, of Portland, Ind., as reported in our issue of Aug. 28, has ordered 10 passenger cars from the Cincinnati Car Co.

*The Seaboard Air Line* has ordered 500 plain box cars and 500 ventilated box cars of 80,000 lbs. capacity from the Western Steel Car & Foundry Co. instead of from the American Car & Foundry Co., as reported in our issue of Aug. 25. These cars will weigh 38,600 lbs., and measure 36 ft. long, 8 ft. 6 in. wide, inside, and 7 ft. 6 in. high from floor to carlin. The special equipment for these cars was described in our issue of Aug. 25.

*The Lake Shore & Michigan Southern*, as reported in our issue of August 18, has ordered three combination coach and dining cars from Barney & Smith. These cars are for September delivery and the equipment includes: Commonwealth Steel Co.'s bolsters, Chicago Railway Equipment Co.'s brake-beams, American Brake Shoe & Foundry Co.'s brake-shoes, Westinghouse air-brakes, Magnus Metal Co.'s brasses, Tower couplers, Forsyth curtain fixtures, Barney & Smith's seats and trucks, Gould draft rigging, platforms and vestibules, Martin heating system, Pintsch light and Railway Steel Spring Co.'s springs and wheels.

#### BRIDGE BUILDING.

ABERDEEN, WASH.—The City Council, at a recent meeting, decided to ask bids for building a steel bridge over the Wishka river at a cost of about \$30,000, to replace the present wooden structure.

ALBUQUERQUE, N. MEX.—The Atchison, Topeka & Santa Fe, it is said, will spend about \$300,000 for bridges and new track in New Mexico and Arizona.

BEAUFORT, N. C.—The War Department has approved the plans for building the bridge over the sound between this place and Morehead City; and work is to be commenced at once.

BLOOMINGTON, ILL.—A bridge 80 ft. long will be built over the Sangamon river at the intersection of Champaign, Ford and McLean counties. The cost, \$20,000, is to be borne equally by the three counties.

COLUMBUS, OHIO.—The Pennsylvania will put up a steel foot bridge over its tracks at North Twelfth street, to cost about \$15,000.

EAST ST. LOUIS, ILL.—The East St. Louis & Suburban Railway Co. will soon let a contract for two viaducts, one of which is to be built over the Louisville & Nashville tracks on North Seventh street at a cost of about \$20,000, and the other at French Village over the Louisville & Nashville and the St. Louis & O'Fallon tracks. The latter is to be 1,000 ft. long, to cost about \$35,000.

FLORENCE, COLO.—The Denver & Rio Grande has decided to replace many of the wooden bridges over the line of its road between Salida and Pueblo with steel structures.

IRONTON, OHIO.—A contract has been given by the Cincinnati, Hamilton & Dayton to Nave Bros. & Co., of Portsmouth, for building the piers for the bridge to be built over the Ohio river.

JERSEY CITY, N. J.—The Pennsylvania, New Jersey & New York Railroad, which is the New Jersey corporation of the Pennsylvania Railroad for building the tunnel under the North and East rivers, has given contracts for the masonry for the bridges between Bergen Hills and East Newark. Drake & Stratton have the contract for the masonry for the drawbridge over the Hackensack river, and McMullen & McDermott, of New York, for the masonry of other bridges.

NORRISTOWN, PA.—Montgomery and Chester County Commissioners have decided to jointly build a bridge over the Schuylkill river at Sanatoga. Plans are being made and bids will soon be asked.

RENFREW, ONT.—The County Council has decided to build a steel bridge over the Waba creek.

ST. JOSEPH, MO.—The Chicago Great Western, it is said, will spend about \$75,000 in improvements between this place and Des Moines. A contract has been let to the Pettibone-Gentry Co., of Chicago, on which work is to be commenced shortly, to replace many wooden bridges with concrete structures.

ST. PAUL, MINN.—A combined highway and street railroad bridge is proposed to be built over the Mississippi river near Fort Snelling, at a cost of about \$25,000.

SCRANTON, PA.—Plans are being made by the Lackawanna Bridge Co. to build a bridge over the Lackawanna river at this place.

SPRINGFIELD, ILL.—Bids are wanted September 4 at the office of the Park Board for building two reinforced concrete bridges in Washington Park. Arthur Hay, Secretary Engineer.

TAUNTON, MASS.—The special grade crossing commission appointed by the Mayor of Taunton, Mass., it is said, has agreed to the plans made by the New York, New Haven & Hartford for the elimination of grade crossings at that place.

TORONTO, ONT.—The Toronto & York Radial Railway Company will build a steel overhead bridge over the Etobicoke River, in Etobicoke township, on its line to Mimico.

WASHINGTON, D. C.—Bids are wanted at the office of the Engineering Commissioner September 16 for building a concrete bridge on the line of the Sixteenth street extension over Piney branch. D. C. Henry is Commissioner.

WISCASSET, ME.—At a recent meeting of the Selectmen of the towns of Damariscotta and Newcastle, it was decided to at once jointly build a steel or concrete bridge over the Damariscotta River between these two places at a cost of about \$15,000.

#### RAILROAD CONSTRUCTION.

##### New Incorporations, Surveys, Etc.

ALASKA CENTRAL.—According to newspaper reports, this company has given a contract to P. Welch & Co., of Spokane, for building 30 miles of its proposed road along the north shore of the Turnagain Arm at about \$1,200,000; also to Rich & Harris, of Prosser, Wash., for the construction of 2,500 ft. of tunnel at Placer River canyon, 50 miles from the Seward terminus of the road; at \$300,000. With the completion of this grading contract, all the heavy work will be finished on the proposed line from the coast to the Tanana district. In addition to the work which the company has let to contractors, it will continue construction work with its own forces, between 600 and 800 men, during the winter.

ASHLAND, ODANAH & MARENGO.—Incorporation has been granted a company under this name in Wisconsin, with a capital of \$100,000, to build a railroad from Odanah, in Ashland County, south to Sedgwick, a distance of about 15 miles, where connection will be made with the Duluth, South Shore & Atlantic. The incorporators include: J. S. Stearns, of Luddington; L. K. Baker, of Ashland, Wis.; John P. Gary, of Chicago; G. F. Merrill, of Ashland, and E. B. Hill and F. J. Darke, of Odanah.

BEAUMONT & GREAT NORTHERN.—Lamb & Hansen, of Trinity, Tex., who have the contract for grading the first 20 miles of this proposed road, which is to run from Trinity to Beaumont, Tex., are asking for sub-bids for this portion of the work.

BROXTON, HAZELHURST & SAVANNAH.—Application has been made in Georgia by a company of this name to build a railroad from Osierfield, Irwin County, on the Atlantic & Birmingham, east through Coffee, Appling, Tattnell, Liberty, Bryan and Chatham Counties to Savannah, a distance of about 130 miles. The incorporators include: J. A. J. Henderson, W. N. Smith, J. A. Pruitt, J. D. Paulk and others, of Ocilla.

CANADIAN PACIFIC.—A contract has been let by this company to Rogers & Quirk for building a line from the Highlands near Montreal, down the south side of the Lachine canal to Cote St. Paul, a distance of about seven miles.

CAROLINA NORTHERN.—This company, which operates a line from Lumberton, N. C., to Marion, S. C., a distance of 41 miles, is planning to extend the road north from Lumberton to Fayetteville, 30 miles; also to build an extension south from Marion.

CHERRYVALE, OKLAHOMA, GULF & TEXAS.—Work, it is said, is to be started September 15 by W. R. Stubbs, who has the contract to grade the first 16 miles of this road. The proposed route is from Caney, Kan., southwest through the Osage reservation via Pawhuska and Perry to Kingfisher, Okla. T., about 160 miles. Senator S. M. Porter, of Caney, is President.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—An officer writes that bids were asked by this company August 31 for masonry work

and grade reductions on the St. Louis division between Coal Bluff and Indianapolis. The proposals were to be for any portion of not less than 10,000 cu. yds. or more than 65,000 cu. yds. of masonry reinforced with metal rods and beams. Bids were also wanted on the same date for grade reduction at Danville, Ind., on the St. Louis division, for the excavation of 500 cu. yds. and for 9,000 cu. yds. of reinforced masonry. W. M. Duane is Superintendent of Construction.

COLORADO, WYOMING & IDAHO.—This line, which was organized in Wyoming and Idaho to build from Denver, Colo., to Boise, Idaho, has given a contract to the Interstate Construction Co., organized in Idaho, for building the section of its road from Walcott, on the Union Pacific, south to Fort Collins, Colo., a distance of 252 miles. Active work is to begin at both ends of the line. (July 14, p. 15.)

DETROIT RIVER TUNNEL COMPANY.—This company, which was formed by the merging of the Michigan & Canada Bridge & Construction Co. and the Canada & Michigan Bridge & Tunnel Co., has commenced work on the railroad tunnel under the Detroit river between Windsor, Ont., and Detroit, Mich. The maps show that the approach on the Detroit side will start midway between Fifteenth and Sixteenth streets on the present line of the Michigan Central. The length of the underground portion of the tunnel will be 2.6 miles, and the distance from surface to surface about three miles. It will take between two and three years to complete the work. The officers of the company are: W. H. Newman, New York, President; H. B. Ledyard, Detroit, Vice-President; D. W. Pardee, Secretary, and Charles F. Cox, Treasurer, of New York.

GENESSEE RIVER (ERIE).—This company, which was recently incorporated in New York with a capital of \$350,000 by officers of the Erie Railroad, is planning to build a low-grade freight line from Portage, in Livingston County, N. Y., on the Buffalo division, south to Cuba, in Allegheny County, on the Allegheny division, a distance of about 20 miles.

GRAND TRUNK PACIFIC.—A contract for the complete construction of the roadbed of this road (other than steel bridges) ready for ties and rails, on the section from Portage la Prairie west to Touchwood Hills, N. W. T., 275 miles, has been let to the McDonald, MacMillan Company, of Westbourne, Man. There were a large number of bidders. Work will be started at once. The line west of Portage la Prairie does not pass through any towns of importance until it reaches Edmonton. It will run about ten miles north of Brandon, pass through the Touchwood Hills and cross the Prince Albert branch of the Canadian Pacific near Saskatoon. It is expected that the entire line from Winnipeg to Edmonton will be put under contract prior to March 1st next. H. A. Woods is Assistant Chief Engineer. Contracts for the remainder of the line to the Pacific Coast, also the branch lines from Fort William to Lake Superior Junction, are reported to have been let to the National Construction Company. This construction company was incorporated in November, 1904, by men connected with the Grand Trunk Railway, including Joseph Hobson, Robert S. Logan, Wenny Walker and others, the total capitalization of the company being nominally \$250,000. Specifications for the first 100 miles of the Lake Superior branch show prospects of very heavy work. The estimates include 300,000 yards of solid rock and 250,000 of loose rock, and six million yards of earthwork.

HARTFORD & WORCESTER STREET.—Plans, it is said, for the construction of this road have been completed by the Shaw interests, of Boston, which control and operate the Boston & Worcester Street Railway. Construction work will be begun within one month. The original survey, which is 23 miles shorter than the steam road, will be followed for a distance of 60 miles. The line will run west from Worcester through Spencer to East Brimfield, where the Springfield branch joins the main line, being continued in an almost straight line to Hartford through Monson. The cost of the work will be about \$3,000,000.

INDIANAPOLIS, LOGANSPORT & SOUTH BEND TRACTION.—The Common Council of Mishawaka, Ind., at a recent meeting granted a franchise to this company for 35 years, to become operative on the completion of its line from Logansport to the southern limits of Mishawaka.

INDIANA ROADS.—Three independent surveys have been made for building an electric railroad from Hartford City, Ind., southwest to Alexandria, a distance of 21 miles. The Indianapolis, Hartford City & Salina Traction Co., of which W. H. Maxwell is President, and in which C. G. Buell and Freeman Wilson, of Fairmont, are also interested, proposes to build a line between these points this fall. The Indianapolis, Hartford City & Western, which has been formed by former members of the first company, also proposes to build a line, as well as the Fort Wayne & Wabash Valley Traction Co., an opposition road to the Muncie, Hartford City & Fort Wayne, which road it proposes to parallel from Fort Wayne to Hartford City and then build to Alexandria.

KANSAS CITY, OLATHE, LAWRENCE & TOPEKA (ELECTRIC).—Wyandotte County Commissioners, at a recent meeting, granted a fran-



chise to this company to build a system of electric roads from Kansas City south to Olathe. The right of way has also been secured through Johnson County and construction is to be commenced within 30 days. The ultimate end of one branch of the line will be in Topeka. Another branch will probably be extended into Allen County, touching Iola, and thence run to Chanute. At the Kansas City end connection will be made with the Westport and Roanoke roads in Rosedale, the main line extending through Rosedale. The project is being financed by New York capitalists, who are represented by W. B. Strang, President and General Manager of the company, of Linwood Boulevard, Kansas City, Mo.

**KENTUCKY ROADS.**—Construction work is to be commenced at once on a narrow-gage road to be built by John C. Day, of Breathitt County, from Natural Bridge, in Powell County, Ky., on the Lexington & Eastern, east to Campton, in Wolfe County, a distance of 11 miles through a rich coal and timber territory.

**LAKE SUPERIOR & SOUTHEASTERN (WISCONSIN CENTRAL).**—This company, which has been pushing the construction work on its new road, will begin track laying shortly. The right of way extends from Superior southeast to Ladysmith, Wis., a distance of about 125 miles, through a rich agricultural territory. (June 30, p. 215.)

**PENNSYLVANIA.**—Surveys have been completed by this company for extending its Turtle Creek branch, which runs from Stewart, Pa., on the Pittsburg division, northeast to Export, a distance of 10.4 miles, east to Blairsville, on the West Pennsylvania division, a distance of about 18 miles.

Plans are being made by this company to raise its tracks about 6 ft. and lower existing streets to eliminate grade crossings through Wilkesburg, Pa., at a cost of about \$250,000. The work will include the building of steel overhead bridges.

**PHILIPPINE RAILROADS.**—The Bureau of Insular Affairs of the War Department has been notified by Secretary Taft, now at Manila, that the date for opening bids for the concessions to be granted by the Philippine Government in aid of the construction of railroads in the Philippine Islands, has been postponed from November 1 to December 1. (June 16, p. 199.)

**PLANT CITY, ARCADIA & GULF.**—An officer writes that this company, which now has 15 miles of road, is planning to extend its present road, which runs from Plant City, Fla., through Hopewell, Alafia, Keyville, Fort Grace, Castilia and Lilly, to Arcadia, 60 miles south of Plant City. No contracts will be let, as all the work is to be done by the company's forces. The route passes through a flat timber territory and there will be only light grades and curves. Construction work is to be commenced as soon as the rainy season is over. Frank A. Wheeler, of Plant City, Fla., is Chief Engineer.

**PUYALLUP RAILROAD.**—Incorporation has been granted a company under this name in Washington, with a capital of \$250,000, to build a railroad from Puyallup west to Tacoma, a distance of about 15 miles. The incorporators include: F. J. Chamberlain, W. H. Elvins and W. D. Cotter. The offices of the company are in Puyallup.

**ST. LOUIS & DES MOINES.**—Articles of incorporation have been filed by this company in Iowa, with a capital stock of \$100,000, to operate railroads in the State of Iowa and in other parts of the United States. The company intends to build a railroad from Des Moines to St. Louis. The officers of the company are: President, George J. Porter; Vice-President, Frank N. Morley; Secretary and Treasurer, Albert E. Little, all of Boston. It is understood that this is the proposed extension of the Minneapolis & St. Louis from Des Moines to St. Louis. The headquarters of the company will be in Des Moines.

**SHAWNEETOWN & WESTERN.**—Incorporation has been granted a company in Illinois under this name, with a capital of \$50,000 and office in Galconda, to build a railroad from Shawneetown, in Gallatin County, southwest through Hardin, Saline, Pope, Johnson and Massac Counties to the Ohio river, a distance of about 55 miles. The incorporators and first board of directors include: John Gilbert, H. B. Pierce, J. L. Murphy and W. H. Moore, all of Galconda, and Charles E. Turner, of New York City.

**SOUTHERN PACIFIC.**—An agreement, it is said, has been reached by this company and the Atchison, Topeka & Santa Fe, under which the California Northwestern, which is controlled by the Southern Pacific, will be extended north from Sherwood to Pepperwood, Humboldt County, Cal., six miles southeast of Scotia, a distance of about 40 miles, where connection will be made with the San Francisco & Northwestern, which is owned by the Santa Fe, furnishing a direct route from San Francisco to Eureka.

**TACOMA EASTERN.**—A certificate, it is said, has been filed by this company, which operates 55 miles of road in Washington, seeking permission to build extensions in Pierce and Lewis Counties; one from Park Junction via Kapowsin, Eatonville and Elbe, a distance of seven miles; also one from a point beyond Park Junction to a point in section 12, township 14, range 4 east, a distance of three miles.

**VALLEY RAILWAY.**—A company has been incorporated under this name in Wisconsin, with a capital of \$25,000, to build a railroad from Green Bay southwest, passing through Depere, Kaukauna and Appleton to Menasha, a distance of about 35 miles. The incorporators include: T. W. Orbison, Ackworthy, E. O'Keefe, R. Ackworthy and O. C. Smith, all of Appleton.

**VANDALIA.**—Plans have been submitted to the city authorities for elevating the tracks of this company and of the Indianapolis & Vincennes through the western part of Indianapolis. It is thought that an agreement will be reached and work commenced shortly. The Vandalia will pay about \$400,000 as its share of the cost.

This company, it is said, is planning to build an extension of its line from Brazil, Ind., south to Saline City, and from that place southeast to Worthington, on the Indianapolis & Vincennes division, a distance of about 45 miles. The proposed new line will form a connecting link, touching important coal districts.

## RAILROAD CORPORATION NEWS.

**ATLANTIC COAST LINE.**—A quarterly dividend of  $2\frac{1}{2}$  per cent. has been declared on the \$10,500,000 capital stock. The annual dividend since December, 1902, has been 8 per cent.

**CAROLINA NORTHERN.**—This road will be sold under foreclosure on October 17, at Lumberton, N. C. It is 40 miles long and runs from Lumberton, N. C., to Marion, S. C. Capt. V. E. McBee is receiver.

**DELAWARE & HUDSON.**—Authority has been granted to the Albany & Susquehanna by the New York State Railroad Commissioners to issue a new first mortgage for \$10,000,000, in order to replace the \$3,000,000 7 per cent. consolidated mortgage bonds and \$7,000,000 6 per cent. consolidated mortgage bonds which mature in April, 1906. This road is operated by the Delaware & Hudson, under a 150-year lease.

**MANISTIQUE, MARQUETTE & NORTHERN.**—This road will be sold under foreclosure on September 21, the interest on its bonds having been in default since Nov. 1, 1903. The decree of foreclosure of June 27, 1905, was for \$1,215,491.

**MAHONING & SHENANGO RAILWAY & LIGHT COMPANY.**—Under this name, the Youngstown-Sharon Railway & Light Co. and the Pennsylvania & Mahoning Valley have been merged. The new company has a capital of \$10,000,000, of which \$4,000,000 is 5 per cent. cumulative preferred stock and \$6,000,000 common stock. Ten million dollars 10-year 5 per cent. gold bonds will be issued. The Youngstown-Sharon owns and operates 40 miles of road in and about Sharon, Pa., and from Sharon and New Castle, Pa. to Youngstown, Ohio. The Pennsylvania & Mahoning Valley operates 85 miles of track connecting New Castle, Pa. with Youngstown and Leavittsburg, Ohio.

**MASSACHUSETTS ELECTRIC COMPANIES.**—An issue of \$3,500,000  $4\frac{1}{2}$  per cent. gold coupon notes of 1910 subject to call on any interest date at 102 has been authorized. Of this amount, \$800,000 has already been issued and the remainder is reserved to retire existing coupon notes which mature Jan. 1, 1906. The collateral for this new issue consists of shares of the Old Colony Street Railway and the Boston & Northern Street Railway. The Old Colony Trust Co., of Boston, is trustee.

**PENNSYLVANIA & MAHONING VALLEY (ELECTRIC).**—See Mahoning & Shenango Railway & Light Co. above.

**PHILADELPHIA & WESTERN.**—A mortgage for \$15,000,000 has been filed with the Mississippi Valley Trust Co., of St. Louis, as trustee. This road is under construction from Philadelphia to Parkersburg, Pa., 45 miles.

**PORT ANGELES PACIFIC.**—The Knickerbocker Trust Co., of New York, has brought suit to foreclose the \$2,000,000 mortgage of 1904 of this company. Interest on \$100,000 bonds issued on five miles of road was defaulted last April. This road is  $6\frac{1}{2}$  miles long, leading out of Port Angeles, Wash., and had been in the hands of a receiver for some time previous to the making of the above mortgage.

**SCHUYLKILL RIVER EAST SIDE.**—The Philadelphia Stock Exchange has listed \$5,000,000 first-mortgage 4 per cent. gold bonds of 1925. The principal and interest of these bonds are guaranteed by the Baltimore & Ohio. This road has 50 miles of track in and about Philadelphia.

**WESTERN PACIFIC.**—At a meeting of the stockholders on August 24, it was decided to increase the capital stock from \$50,000,000 to \$75,000,000. This was done to provide for a possible contingency in case the cost of construction should be more than \$50,000,000, for according to California law, bonds cannot be issued to an amount greater than the amount of capital stock. (July 7, p. 8.)

**YOUNGSTOWN-SHARON RAILWAY & LIGHT COMPANY.**—See Mahoning & Shenango Railway & Light Co. above.



